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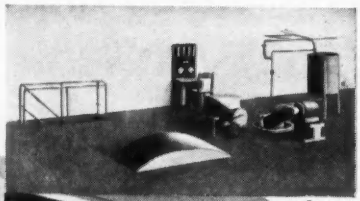

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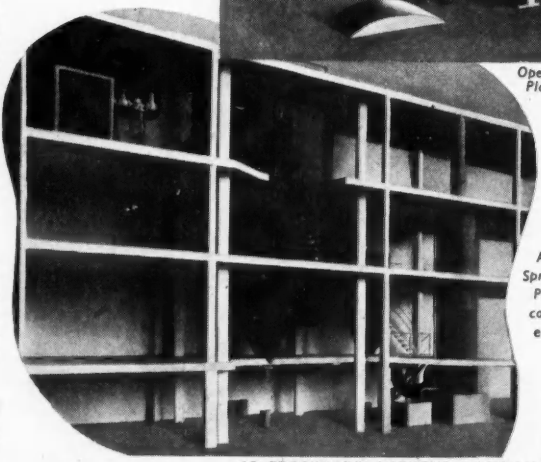

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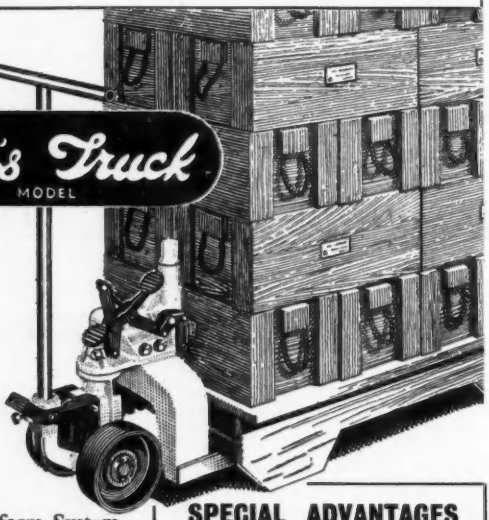

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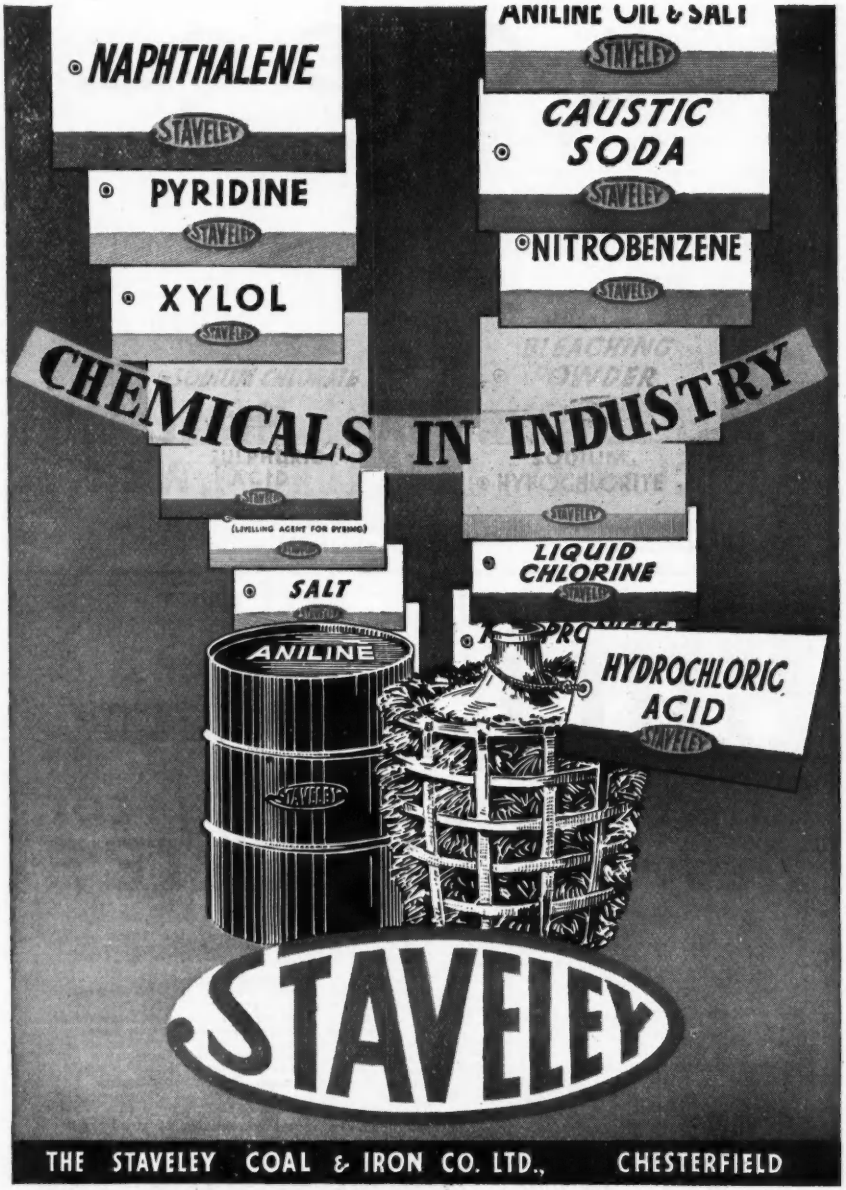
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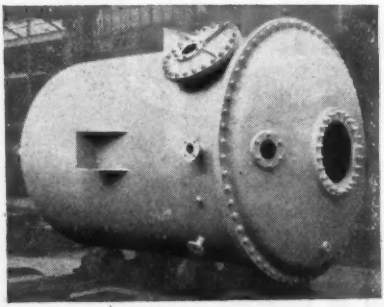

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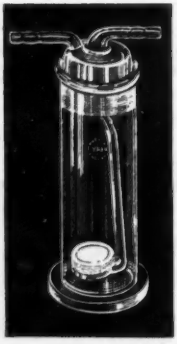

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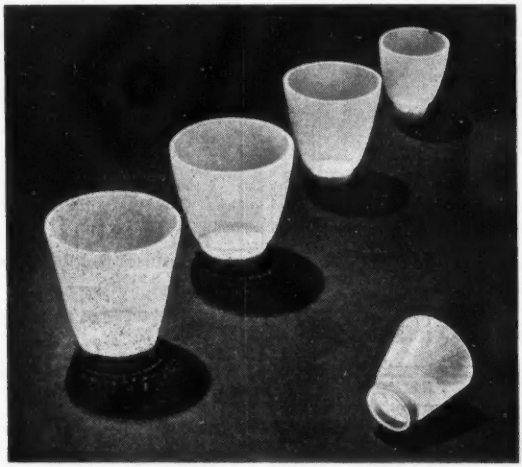

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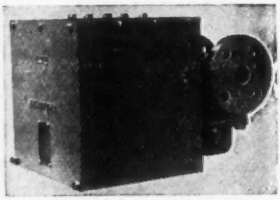

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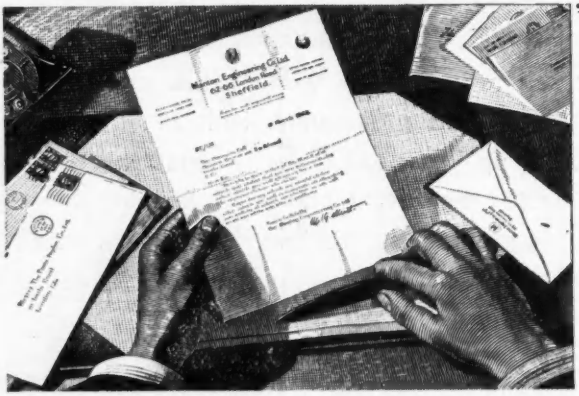

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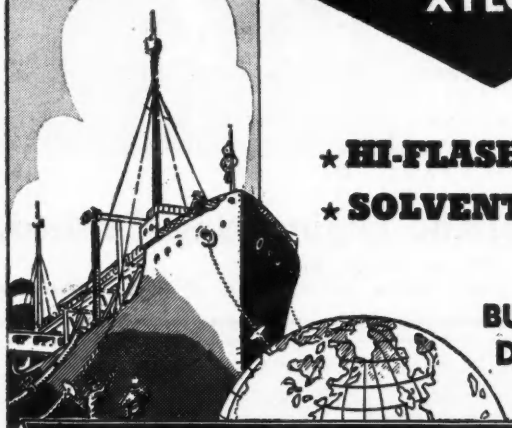

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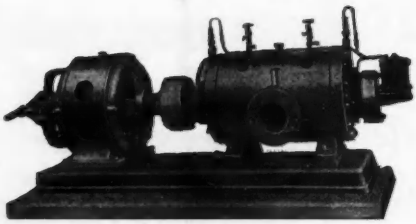

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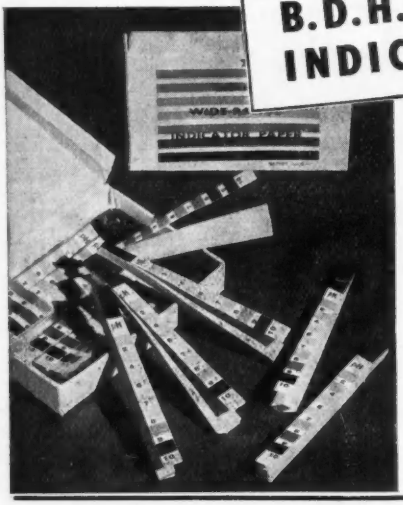

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European Recovery

THE plan for European recovery drawn up by 16 nations concerns the peoples of Europe, including ourselves, intimately. It was obvious to everyone that the destructiveness of this war had greatly exceeded that of any previous war, and that the problems of reconstruction would be proportionately great. Many people thought that once the fighting had ceased, everyone would turn back to work with a will and clear up the mess. That hope proved illusory. There are still vast heaps of rubble where once there were German towns. The Germans, brought up to obey orders, still tend to leave the rubbish where it is until someone tells them to move it. The destruction of property, of plant and machinery cannot easily be made good, and to get the task started is in itself a difficult undertaking. Labour must be made available; skilled labour must be sought with diligence if it is to be found at all. Materials are unobtainable. The division of Germany into zones internationally controlled, with a semi-permeable membrane between certain zones through which the more solid goods do not pass, adds to the difficulty. Europe's prosperity was in large measure dependent on German industry, and the vacuum now existing in Central Europe is proving hard to fill.

Every European nation, victors no less than vanquished, has been impoverished through the war. The agricultural production of every nation has been disrupted. Food is short and Eastern European producers on whom so many depended for their grain have none to spare. Famine stares Europe in the face. The manufacturing plants of other parts of Europe besides Germany are out of gear. Export trade is very much less than before the war, and many have not the money to spend on goods. Other nations besides Britain have lost their invisible exports and their overseas investments. Many nations are in much the same plight as Britain, and in some their plight is worse and more pressing. To all these the Marshall Plan came as a gleam of hope and as such it has been made the signal for action.

The difficulty of the period of bad trade that followed the war of 1914-18 was that there was production without markets. Industrial plant had not been destroyed to any extent, but on the contrary additional plant had been built for war purposes that was converted to peaceful manufactures. Foreign agriculturists had increased their sown acreage for every kind of edible produce. The world was full of goods and of provisions, but people were too poor to buy them. Had there been some means of permitting people to buy more goods than their real wages entitled them to, an age of plenty might well have resulted in which there would have been no excuse for war. We did not solve that problem. Factories closed. Producers of foodstuffs burned their produce in despair. Not until war production again enabled a high rate of manufacture to be secured did unemployment and malnutrition fall to reasonable levels. That was a crisis of underconsumption.

The crisis to-day is deemed to be the opposite; a crisis of under-production. Consequently, the 16 nations that have accepted the Marshall Plan have declared that each will put its internal economy on a sound basis and that everything possible

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will be done to bring productive capacity back to, or above, 1938 levels. Agriculture is to be brought back to that level. Coal production is to be increased, though it cannot touch the pre-war figures—not all at once. The output of electricity is to be raised by 40 per cent above 1947 level by 1951. Home refining of oil—a policy frequently urged in this paper during the past few years—is to be raised throughout Europe to at least 2½ times that ruling before the war. The output of steel is to be increased to 80 per cent above 1947 and 20 per cent above 1938. These measures will suffice to bring European production broadly back to pre-war standards though not entirely so. The standard of living will still be less than in 1938. The increased steel output is necessary to restore war damage and to provide for new machinery. There is nothing in the programme that creates the feeling that the 16 nations are being too ambitious. It is true that the final implementation of the plan depends on a free flow of trade with adequate export markets. It is possible that after 1951 we shall find ourselves facing the problem that defeated us in 1930; but with goodwill all round throughout the world, that problem should prove less intractable than it did 20 years ago.

It is very cheering to observe through this report the spirit of comradeship among the nations of Europe. For example, a series of projects is being planned for the exploitation of new sources of electric power, including hydro-electric resources of the Alps, German lignite and Italian geo-thermal energy; this involves co-operative development of resources cutting across frontiers, and decisions are being taken without regard to these frontiers. International standardisation of mining and electrical equipment and of freight cars is another example of the merging of the national in the international. Yet another is the interchange of information between nations on the development of their steel industries. These developments suggest a first tangible approach to Mr. Churchill's conception of a United States of Europe. It is particularly apposite that this should come about through the international development of scientific and technical resources.

American help will be needed to get this programme into practical operation. The needs of Europe are greater than can be met through the internal resources of the Continent at present. Import needs are greater than normal, investment earnings are reduced, industries have been handicapped by nationalisation, exports are insufficient to meet the cost of imports. In Britain there will be much to be done to help Europe—and ourselves. This crisis should leave no one in doubt that among nations, as among the concerns forming part of any specific industry, the prosperity of each one is important to the balance of the whole. Under modern conditions we cannot be prosperous unless our customers and competitors are also prosperous. In economics, our unit must be the world and not the nation, the firm or the individual—as it too often has been in the past. Britain, therefore, is pledging much of her own production directly to help Europe's reconstruction. It is our part to increase our exports of coal to Europe, to increase our steel output, to

increase and rebuild our merchant fleet, to increase the capacity of our electrical generating stations, and of our agriculture. Very large increases over the whole range of industry and agriculture are to be our part in the reconstruction of other countries. If these problems are tackled boldly, with vision and enterprise, and with the help of American finance, the future is bright; but hard work is essential to success. What is now needed is a leader to arouse our people to the realisation of the part that they must play in the rebuilding of the world.

NOTES AND COMMENTS

A Bad Start

THE first " progress report " since the desperate need of greatly increased exports was given official prominence by Sir Stafford Cripps can give rise to no optimism. Total value of U.K. exports in August was £93.6 million—£16 million less than the July figure. That is a bad start, even if we disregard the facts that the further efforts now required had not been made known when the transactions on which these figures are based were being made and that the July returns represented an abnormally high level of trading. The immediate export target, we are told, is about £126 million monthly, leaving a gap between last month's results of more than £32 million. Whatever lessons are to be learned from the latest unpromising survey by the Board of Trade, one thing at least is manifest to all—not excluding, one hopes, Sir Stafford Cripps: no very substantial improvement will be possible unless fully adequate supplies of fuel and power are provided. It is undoubtedly because of this deficiency, heightened by difficulties of the raw materials market, that chemical production, reflected in the Board of Trade survey, sagged in August to £3,073,601 from the £3,398,005 of the previous month and that the result for the first eight months of the year was only £23,591,969 compared with more than £27 million a year before. Almost every branch of heavy chemical production has shown the same falling off and there have been very conspicuous reductions of chemicals most dependent upon fuel supplies, notably of soda ash and other sodium compounds, of which we sold £950,744 worth in the past eight months, some £728,000 less than in the same period of 1946.

Industrial Genesis

AMONG the discoveries from which great chemical industries have sprung few, if any, are more arresting in their " Jack and the Beanstalk " quality than Alfred Nobel's revelation in the '60's of last century that death-dealing nitroglycerine, when absorbed in the filter substance kieselguhr, was a relatively safe and by far the most potent commercial blasting agent then known. That discovery was, of course, the germ of the vast I.C.I. Explosives Division, successor to Nobel Industries, Ltd., which, under Sir Harry McGowan, was one of the four participants in the formation in 1926 of Imperial Chemical Industries, Ltd. The story is ably told in detail in the current issue of the *I.C.I. Magazine*, describing how Alfred Nobel was first cold-shouldered by the English black powder manufacturers and finally enabled to betake himself and his little-appreciated dynamite formula to a hundred acres of near-desert at the estuary of the Clyde. " The most depressing place in the world . . . everlasting bleak dunes . . . only the rabbits find some nourishment, eating a substance which quite unjustifiably goes by the name of grass," he wrote to a friend. That was Ardeer, first home of the British Dynamite Co. and to-day one of I.C.I.'s " chemical cities," from whose research laboratories have come not only explosives infinitely more potent than dynamite, but peaceful products for paints and finishes, agriculture and textiles which would have rejoiced the repentant dynamite man who founded the Nobel Prize award.

Leather Trades' Review

THE 80th anniversary of *The Leather Trades' Review* (a sister journal of THE CHEMICAL AGE in the Benn group) is commemorated by a special number in which progress in the leather industries in the last eighty years is recorded. In an interesting article on " Tanning Conditions in 1867 " mention is made of the first work on synthetic tannins by Hatchett in 1800. Hatchett reported : " Having by means of

nitric acid obtained solutions from asphaltum, from jet, from several of the pit coals, and from charcoal, I evaporated them to dryness in separate vessels, taking care in the latter part of the process to evaporate very gradually, so as to completely expel the remainder of the acid without burning the residuum, this, in every case, proved to be a brown glossy substance which exhibited a resinous fracture." The chemical properties of these residua were as follows: They were readily soluble in water and alcohol and were highly astringent. Solutions of glue or isinglass were immediately precipitated to give insoluble precipitates and the general behaviour indicated that they were new types of "tannin." One hundred years were to pass before any use was made of his invention. The use of caustic soda was, in 1860, known for depilation and mention is made of the use of "hydrosulphuret of calcium." The suggestion was made that this product should be prepared by supersaturating a very thick milk of lime solution with sulphuretted hydrogen gas. It was admitted that the process could be unpleasant for the worker, but in defence a quotation from the Encyclopedia of Chemistry was used to the effect that, "although offensive, it may be inhaled by men without apparent injury. The effect upon one workman was a pleasant (*sic*) lethargic feeling, etc., etc." Other amusing and interesting items of a chemical nature are given in this Anniversary Number. We congratulate *The Leather Trades' Review* on its 80th birthday and wish it another such period of healthy progress.

The Leaden Curtain

TO find oneself in agreement with Mr. R. Edwards, general secretary of the Chemical Workers' Union, is not an everyday occurrence. His resolution at the Trades Union Congress at Southport recently calling for relaxation of the "hush-hush" policy which has withheld practically all information since Government schemes for the peacetime exploitation of nuclear fission began will, however, find a sympathetic response in circles wider than the T.U.C.—which remitted the resolution to its General Council. The trade union secretary's case was based on claims that the present secrecy limits trades unions' ability to safeguard members' interests and discourages recruitment of scientists and workers for vital work, and he asked that the Government should be pressed to facilitate an official inquiry into the operation of atomic research stations and laboratories and the conditions under which workers were called upon to serve. His rider that the time had come "to choose between atomic death and Socialist life" was on more controversial ground, to say the least of it, but may be safely disregarded as being merely a political decoration suitable to the occasion, regardless of its irrelevance. Somewhat similar views about the lead curtain which surrounds atomic affairs have previously been expressed in quarters sufficiently diverse to indicate that this is no partisan view, and, while in present circumstances every precaution is certainly being taken to safeguard workers, publicity is the best assurance that there is no relaxation of those vital conditions and, of equal importance at the moment, that no opportunity is being lost of pressing forward the practical applications of this potent source of energy. How meagre is the information not only of the "man in the street" but of most of the men in our laboratories as well was underlined by the exclusion of the subject at the recent Chemistry Congress and by the news value attaching to the statement made at the Hague last week by the Didcot station's director of research, Prof. John Cockcroft, that experimental atomic power units might be in use within three to five years. Our darkness is profound and too prolonged and should be relieved now as far as international security permits.

Chilean Copper and Fertilisers

A report from Chile states that exports during the second quarter of 1947 included 50,000 metric tons of electrolytic copper, 5000 tons of nitrate of soda and 3500 tons of sulphate of soda. A brisk demand for the latter product continues. Advices from Iquique refer to the success of experiments which have been carried out locally in connection with the enrichment of nitrate of soda with potash to produce potassium nitrate of great fertilising value. The cement industry is to be expanded by the establishment of several new factories, and Chile may be in a position to export about 50,000 tons of this product per annum, although it is understood that one factory is suspending production attributed to lack of storage space and to shortage of coal.

CONTROL OF ENGAGEMENT ORDER

Chemists' Position Obscure

FROM the newly amended Control of Engagements Order—occasioned by the critical economic situation of the country and the consequent need for an all-out export drive—which comes into force on October 6, it is not clear whether qualified chemists are or are not liable to direction in the event of their becoming unemployed or wishing to make a change.

Ambiguity

One class of excepted persons, described somewhat ambiguously in the Order as "managerial, professional, administrative or executive," would seem to include qualified chemists, but this is by no means certain—as inquiries made by THE CHEMICAL AGE have revealed. The Ministry of Labour has informed us that a "clarifying" list of professions exempt from the provisions of the Order is being prepared, and will be made available shortly. Meanwhile, the old Order included qualified chemists who transferred from one post to another via Appointments Offices of the Ministry of Labour.

The Control of Engagement Order, 1947, was made on September 18, 1947, under Regulation 58A of the Defence (General) Regulations, 1939, and comes into force on Monday, October 6, 1947. It will expire at the end of 1948.

With certain exceptions, all men aged 18 to 50 inclusive, and women aged 18 to 40 inclusive, are covered by the Order.

Restrictions Imposed

An employer may not engage or even seek to engage (*e.g.*, by advertisement, poster, or circular letter) any worker to whom the restrictions apply, otherwise than through a local office of the Ministry of Labour and National Service or an employment agency approved for the purpose. Similarly, workers must obtain their employment through a local office of the Ministry or approved employment agency.

Advertisements and notices of vacancies are only allowed if they clearly state that they invite applications only from excepted persons, *e.g.*, boys and girls under 18; women of 41 and over, or men of 51 and over. Newspaper advertisements may be published in a column bearing a cautionary heading, restricting the vacancies to persons or employments excepted from the provisions of the Order.

Exemption certificates may be issued by local offices to employers permitting them to advertise for and engage workers direct. Such certificates would be subject to conditions, *e.g.*, restricting the employers as to the number and type of workers who may be engaged or advertised for.

Certain persons are free to be engaged directly for employment. They are persons outside the age limits; women with children of their own under 15 living with them; members of H.M. Forces and women's Services during the period of their paid resettlement leave.

Certain employments can also be taken without reference to a local office of the Ministry or approved employment agency, including part-time employment for not more than 30 hours weekly, whether with one or more employers; employment in a managerial, professional, administrative or executive capacity.

The restrictions also apply to engagements in this country for employment abroad.

The interests of directed persons are safeguarded by the existing Control of Employment (Directed Persons) Order, 1943, which provides that the employer may not dismiss a directed person (except for serious misconduct) while the direction is in force.

More detailed information about the Order will be contained in a leaflet "Notes for guidance on the restrictions imposed by the Order," copies of which will shortly be available on application to the Ministry of Labour and National Service (L.S.28), 15 Portman Square, London, W.1.

Chemical Trading Increased

A CONTINUOUS increase in U.K. imports and exports of chemicals and allied materials is a feature of the Board of Trade summary of imports and exports in 1947. Average monthly values of chemicals, drugs, dyes and colours imported in the first quarter of the year were £1,463,000 and in the second quarter £2,229,000. Imports in July were worth £2,404,000 and in August £2,530,000. Exports of chemicals, drugs, dyes and colours in the first quarter of the year averaged £5,804,000, in the second quarter £5,241,000 and in July jumped to £7,171,000. August's total was £5,555,000.

Swedish Import Changes

The Swedish Government has decided further to curtail the free list for imports. Consequent upon this decision, announced last week, import licences have now to be obtained for all minerals including coal and oils, chemical products, steel, etc. Some chemicals, however, may be imported without licence.

INDUSTRIAL DERMATITIS

Causes and Prevention Reviewed

AMPLE cleansing facilities, substitution of mechanical for manual processes wherever practicable and enclosed methods of manufacturing are among the principal safeguards to be observed in reducing the incidence of industrial dermatitis—the most widespread of occupational diseases, which is the subject of a very comprehensive review recently made by the Technical Service Department of Aero Research, Ltd., Duxford, Cambridge.

The most injurious industrial substances in this connection are given in order of toxicity as: 1, Petrol products; 2, alkalis and their components; 3, fat solvents and degreasing agents; 4, metals and metal plating compounds; 5, lubricants, soluble and insoluble; 6, paints and paint solvents; 7, chromates and chromic acid; 8, dyes; 9, synthetic resins; 10, rubber and its compounds.

Risks with Formaldehyde

Special attention is given in the survey to the ninth item, synthetic resins, the most damaging constituent of which is formaldehyde, which irritates the mucous membranes and is capable of causing also conjunctivitis, pharyngitis, laryngitis and bronchitis. Free phenol, especially in conjunction with caustic soda, is especially injurious to the skin, the respiratory and intestinal track.

Of formaldehyde, it is noted that both the fumes and the liquid are capable of causing dermatitis. Any damage to the skin of the hands or forearms greatly increases the risk, and allowing traces of the synthetic adhesive to dry on the skin is another fruitful source of trouble. Notwithstanding the injurious effect of fumes (20 parts of fume per million in the atmosphere is stated to be the limit of safety), the increase of skin disease of workers with cold setting glues is higher than that of those engaged with hot materials.

Safeguarding the Skin

The survey quotes the official memorandum on the Prevention of Industrial Dermatitis which bases preventive measures under two primary heads:—

(1) The glue, of whatever composition, must be prevented from remaining in contact with the skin longer than is absolutely necessary, and in any case not long enough to harden.

(2) All traces on the skin of chemicals developed during glue action must be removed or rendered inert before leaving work.

To achieve these conditions the memorandum recommends:—

(a) Frequent cleaning of the fingers on a damp swab of loosely woven stockinette or other readily absorbent material which does not present a harsh surface to the skin.

(b) Regular application, before work, of a suitable barrier cream.

(c) Use of a chemical neutraliser to remove formaldehyde or alkali from the skin (*e.g.*, sulphite soap).

(d) Thorough washing, with ablution facilities *near to the gluing operations*, and a supply of clean towels for effective drying.

Special Susceptibility

Of special interest in the Aero Research study of causation is the statement that: Experience gained from personnel using synthetic resin adhesives has shown that some individual workers, even certain types of workers have a tendency to contract dermatitis more readily than others. Such people are said to be allergic, and this is another factor to be taken into consideration when the causes of dermatitis are assessed.

As far as types of worker can be roughly classified, according to the degree of susceptibility they exhibit, it may be said that women are more likely to become affected than men. Women have usually less greasy skins, which have a slightly higher *p*H, *i.e.*, skins which in general show a slightly lower degree of acidity. Fair people are more susceptible to sensitising agents than dark, and fat solvents are more irritating to dry skins than to oily ones.

Psychology of Dermatitis

A further factor to which insufficient attention has been given is the psychological aspect of dermatitis, which, it is stated, is often the result of emotional stress. "Wartime direction of labour brought in its wake a vast number of cases of industrial dermatitis which did not respond to routine medical treatment, and many of these were found to have been associated with the strain of domestic and other problems. . . . While the diagnosis and treatment of such cases is a matter for the specialist, it is worth while considering whether some persons subject to constantly recurring attacks of skin disease are not, in fact, the victims of their own emotional make-ups." The result of transferring such a patient to work where no risk of dermatitis exists is suggested where the possibility of compensation arises.

Chemicals Used for Glass Colouration

COLOURED glass is in extensive demand for scientific apparatus, signalling lamps, photographic filters and other equipment. For this a standardised product is needed which can only be produced by a knowledge of the chemical reactions involved and careful control of the manufacturing processes. In an article on "The Chemistry of Glass Coloration" in the July issue of *Endeavour*, which is beautifully illustrated with coloured plates, Mr. L. M. Angus-Butterworth deals with the different chemicals used since early times for the colouring of glass.

According to the author there is a longer history of coloured glasses than of the transparent variety. Pieces of coloured glass have been found in Egypt bearing the name of a king living in 5000 B.C. while transparent glass did not appear there before about 660 B.C. One of the first uses of coloured glass in England was in cathedral windows.

Cathedral Glass

The common belief that we do not know today how to reproduce the brilliant colours of the early cathedral windows, was partly true up to about a hundred years go, writes Mr. Angus-Butterworth. But today, he avers, the glass technologist knows far more about colours in glass than was ever known before. He points out that the old cathedral glass when originally placed in position was often very crude in colour and dark in shade. It has taken hundreds of years to become mellowed. The steady abrasive action of rain driving against the glass through the centuries, and the chemical dissolving action through the slight acid content of much of our rain water, especially in towns, has gradually changed thick and comparatively dark glass to glass which in some cases is as thin as tissue paper and which now has light and vivid colours.

Even the impurities in the metals, he adds, which the early glassmakers could not control, gave variety to their products. In a variety which is not now possible as glass-making materials and processes are so carefully and completely controlled that results are, or should be, well ascertained in advance.

Among the agents for the production of the common colours in glass, Mr. Angus-Butterworth mentions cobalt and nickel oxides, used together, as giving opaque black glasses, and cobalt and copper for colouring glasses blue. Cobalt is the more commonly used, although it transmits a deep red band in addition to blue. Accordingly if a cobalt blue is combined with a copper bluish-green, the latter absorbs the red and an excellent blue glass is obtained. Copper with a small amount of iron will give a colour midway between blue and green. It has been found that potash glasses give a purer blue than the corresponding sodium glasses, and that boro-silicates yield a reddish hue.

An interesting modern use of cobalt is mentioned by the author. If small amounts of cobalt, manganese and copper oxides are used together in the batch, what is now known as the daylight effect is obtained. What happens is that these oxides eliminate part of the light from the artificial light sources, and the filtered remainder more closely resembles natural sunlight.

For the production of green glasses iron, copper and chromium are employed. Other substances, such as stannic oxide, are very rarely used. The presence of 0.23 per cent Fe_2O_3 gives an almost colourless glass which is greenish-blue in thick layers; 0.48 per cent a light sea-green; 0.73 per cent a bright sea-green; 1.23 per cent a bright yellowish green, but still transparent; 8.23 per cent a dark olive green, still transparent even in thick layers; 11.12 per cent a dark olive green but opaque in thick layers.

The colours given by copper depend upon the conditions under which the glass is melted. A blue or green glass is obtained from copper compounds under oxidising conditions, and a ruby colour under reducing conditions. For green glasses the black or cupric oxide is used.

Grey ("Smoked") Glass

To produce grey or "smoked" glass the colouring agents used are combinations of (a) cobalt, nickel and uranium oxides, or (b) manganese, iron and copper oxides. The glass may be of either the soda-lime or lead-potash type.

In most opal glasses the opacity is dependent upon the separation of either finely divided silica or some metallic oxide, or both, from the mass of the glass. The separation is assisted by the presence of fluorides and phosphates. A certain degree of opalescence may result from the separation of the fluoride or the phosphates themselves from the glass, but as a rule the batch is such that they remain combined as fluo-silicates and phospho-silicates, throwing the silica out of solution. The source of the opal colour in glass therefore may be either excess of silica, excess of a metallic oxide, *e.g.*, of aluminium, tin or antimony, or the presence of fluorides or phosphates.

According to the author, compounds of manganese, which give a purple colour, are among the oldest colouring agents used in glass. To secure a deep colour with manganese the founding has to be under

oxidising conditions, as reducing agents destroy the purple tint.

Copper Oxide

Copper oxide in the cuprous form, melted under reducing conditions, gives an excellent ruby. If a copper ruby is reheated slowly for some time the particles of copper aggregate and become visible to the naked eye, giving a semi-opaque glass filled with golden yellow spangles. When a gold ruby glass is made today, which is not often, it is generally prepared from a soft lead batch containing an excess of antimony and arsenic. The gold is added in the form of a solution of gold chloride in the proportion of 1 oz. of metal to 200 lb. of batch.

Although selenium is now being used as a source of red colour in glass, the colour is difficult to retain because of the tendency of selenium to volatilise.

Colours ranging from violet to purple can be obtained by adding less than one per cent of titanium dioxide to the batch mixtures of certain borosilicate or phosphate glasses.

Spectral Yellow

At present, according to Mr. Angus-Butterworth, it is believed that no single element can be used to isolate spectral yellow in glass. Glasses of varying shades of yellow are, however, produced by means of cadmium, silver, sulphur and uranium. Carbon is commonly used in the manufacture of yellow glasses, being introduced in the form of coke, graphite or anthracite. It is the sulphate-containing impurities in the carbon which are the true source of the colour.

For amber glasses it is usual to employ a mixture of sulphur and charcoal. Experiments have led to the conclusion that only polysulphides, polyselenides or polytellurides will give yellow colours, although a stable yellow can be obtained with sodium uranate, or with uranium plus antimony in glasses containing lead.

SCOTTISH PEAT PROSPECTS

EFFORTS are being made in Scotland to influence the Government to accept a policy of development of peat resources, so far with small success, although the Government has announced a limited start in certain areas. The argument advanced by the Scottish interests is that Denmark and other Continental countries have proved that peat can fulfil many of the functions of coal, oil and even petrol. The Danes are running cars on peat charcoal.

Although the Scottish Office is known to be studying the subject, it is believed that they have merely compiled a mass of information, most of which was already available. Three small schemes have been launched, but only on a limited manual scale.

Major Scheme Required

What is demanded by the peat enthusiasts in Scotland is a major scheme with all the allied mechanisation, by-product industries, transportation and other facilities which such a major venture will demand. The attitude of the Government would appear to be that any revival of the coal industry would make such a mechanised scheme uneconomic.

Whether the Government is justified in banking on a revival of ample coal, remains to be proved, but the peat experts claim that recent economic trends have shown that the balance of economic favour has moved entirely towards the peat industry.

Peat could be harvested on a major scale by mechanised methods and at a price which could compete successfully with a revived coal industry.

Apart altogether from this, the fact that 5000 million tons of peat remain unexploited is regarded as a grave injustice to Scottish economy. The Scottish Reconstruction Committee is demanding now the systematic reclamation of land, the production of solid, liquid and gaseous by-products, and the generation of power.

ATOMIC ENERGY PLANS CRITICISED

SIR ROBERT RENWICK, chairman of the County of London Electric Supply Co. and a director of other electricity supply companies, addressing a meeting of the Society of Individualists and National League of Freedom under the presidency of Sir Ernest Benn in London last week, urged the Government to allow industry to take a greater part in the development of industrial use of atomic energy. Foreseeing a second industrial revolution developing from the use of atomic energy, Sir Robert reproached the Government for its apparent reluctance to take British industry fully into its confidence. Atomic energy development in this country was a State monopoly, and as such was red-taped; industry in this country was being kept in the dark as to what was happening. By contrast, he said, American industry is fully conversant with atomic progress.

On the subject of coal allocations, Sir Robert warned that though the Government might see to it that power stations received their full supplies, the lack of coal for railways and other key industries might well be disastrous. With regard to coal production, he said that if the nationalised coal-mines produced as much coal per man hour as they did in pre-war years under private enterprise with less up-to-date equipment, there would be world-wide sterling demands.

GAS PRODUCTION AND THE CHEMICAL INDUSTRY*

by Dr. J. S. van AKEN

THE United States of America, being fortunately endowed with natural gas in abundance, has no problem to solve in the supply of a cheap gaseous fuel for industrial and domestic purposes. In Western Europe on the other hand natural gas is found only sporadically, so the gaseous fuels must be obtained from coal.

In the chemical industry gas is needed as a raw material for the manufacture of numerous products. In other sections of industry, certainly for the production of high-quality products, gas is indispensable. Any increase of national prosperity involves a greater demand of gas for domestic purposes. This requires, certainly in Western Europe, the extension of gas production on a large scale. The present coal shortage urges immediate examination of the manufacture, transport and distribution of gas. Successful co-operation between the chemical industry and the public gas supply services may contribute considerably to the solution of this problem.

Situation in the Netherlands

Since radical changes have been necessitated in the Dutch gas economy—to the realisation of which both the chemical industry and the public gas supply services are co-operating closely—it may be interesting to give details of the situation in the Netherlands.

At present, there are about 130 gasworks in Holland, some being very small. These gasworks have a record of distinguished service, but their growth and technical development have long since ceased. On the other hand there are a few large coke-oven plants of quite recent date which are in a state of steady extension and technical development. Gas supply from a gasworks is limited to the area adjacent, where the gas is used mainly for domestic purposes, industrial applications being restricted.

The coke-oven works are integrated either with blast furnace works or with collieries, and are combined at the same time with chemical works and power stations. As the coke-oven works are part of two big industrial combines, the internal gas economy is complicated. Moreover, these coke ovens have entered the field of public gas supply, and supply gas by means of a long distance grid to an area which is being steadily extended. The gas consumed in that area is used mainly for domestic purposes; a considerable part, however, is used in industry.

This is, in brief, the present situation. How did this situation arise?

At the time when the coke-oven plants were built, practically every town and every municipality had already operated smaller or larger gasworks for several years. Consequently the coke ovens found the field of public gas supply occupied.

That was evidence indeed of the abundance of fuel our national economy had at its disposal in those days. There was no need for using these big quantities of gas for the public gas supply. While in coke-oven plants the gas was used only for the generation of steam and thence of electricity, in most gasworks products such as benzol and toluol were not recovered. The innumerable possibilities then already existing for the manufacture of various useful substances from these constituents of gas were not exploited, chiefly because the market was flooded with benzol, toluol and similar products.

Because a sufficient outlet for coke-oven gas could not be found through the public gas supply, and since the use of the gas for generation of electricity was only of low efficiency, a very cheap raw material was placed at the disposal of the chemical industry. Nitrogen fixation plans arose adjacent to coke ovens. Hydrogen was extracted from the coke-oven gas, and after being converted into ammonia, served for the preparation of various nitrogen fertilisers. Reaction gases of very high purity and of constant composition were produced for this purpose by the chemical industry.

Quality of the Gas

To obtain the hydrogen, the coke-oven gas must be separated into its components. From a technical point of view this separation process gives rise to difficult problems. It soon appeared that the complicated process of separating the gas could be successfully performed only if a gas of constant composition were available, from which the various disturbing impurities had been eliminated. The results achieved by the constant efforts to improve the quality of the coke-oven gas proved to be very valuable also for the public gas supply. They made a notable contribution consequently to the delivery of energy to other sectors of industry.

It would carry us too far to detail the various technical discoveries and improvements that have been made. A single example will suffice to show how simple measures have led to valuable results. Coke-oven walls are built from refractory brick

* Read before the Fuel Economy Conference held recently at The Hague.

and from their nature are not gas-tight. In order to avoid loss of gas, the oven was kept under slight vacuum, and air and waste gases found their way into the oven chamber, thus diluting the coke-oven gas which the chemical industry had to use as a raw material.

Explosions took place in some similar nitrogen plants abroad, and it was then discovered that the gas contained traces of nitric oxide and that this small impurity was responsible for the trouble. To remove this impurity it became necessary to operate the coke-oven chamber under a slight pressure. It was then found that the gas leaking through into the oven chamber was cracked when passing over the hot oven wall, resulting in carbon deposits in the pores of the oven walls, whereupon leakage ceased. In this manner a gas of higher calorific value and of constant composition was obtained.

A coke-oven plant linked to a chemical industry must produce a purified gas of high quality and uniform composition, because the slightest variation in the quality of the gas may disturb the regular performance of the separating apparatus.

Effect on Other Industries

With the rapid increase in coke-oven plants such large quantities of gas were manufactured that the chemical industry could not entirely absorb these quantities. The large surplus had to be burnt under steam boilers, but it could better have been sold to various industries at low prices.

These industries were able to avail themselves of the new possibilities. In the ceramic industry, in the manufacture of filament lamps and radio tubes and in the iron and steel industry new methods were developed. These methods could not have been adopted if either producer gas or normal town gas had had to be used. The ceramic industry could now change over to a method of continuous burning of their wares in tunnel kilns without using saggars. Vitreous products could be manufactured in a single burning operation and there was a wider choice of enamel and glazes. In the manufacture of filament lamps fully automatic machinery of an elaborate type could be applied.

All this proved to be feasible because of the very pure and constant quality of the gas.

New Prospects for the Gas Industry

By compressing the gas immediately after the de-tarrer, the hydrocarbons and ammonia can be recovered in a better and easier way, and by so doing inconvenient constituents such as hydrogen cyanide and hydrogen sulphide may be converted into valuable raw materials for the chemical industry.

Hitherto it has been customary to recover the tar and the ammonia from the crude coke-oven gas at atmospheric pressure and afterwards to compress that part destined for the chemical industry and the public supply. Now that a stage has been reached at which practically the whole of the coke-oven gas is consumed by the chemical industry and the public gas supply, it is obviously preferable to compress the crude coke-oven gas immediately after it has been de-tarred. This procedure creates new possibilities for the purification of gas. The ammonia solution can now be made to contain 9 per cent of ammonia, whereas previously a foul liquor containing hardly 1 per cent of ammonia resulted. This process abolishes the necessity of fixing the ammonia by means of expensive sulphuric acid, and the concentrated ammonia liquor can now be worked into more lucrative products.

Steam Consumption Reduced

When operating this process the consumption of steam for the recovery of ammonia and hydrocarbons will be drastically reduced. Whereas when working at atmospheric pressure the elimination of hydrogen cyanide and hydrogen sulphide entails high expenditure without any compensating profits, the high-pressure process makes it possible to recover these ingredients in concentrated form, so that the nitrogen fixation plant connected to the coke ovens can convert them into valuable products.

When working at high pressure the naphthalene can be eliminated completely, so that troublesome deposits in the mains and apparatus will be avoided. A substantial saving in steam can thus be effected, while more useful products and a less corrosive gas of higher purity are obtained.

The expenditure involved in compressing the gas, expenditure which cannot be avoided as the gas must be compressed for the chemical works and the public supply, is therefore balanced by the profits acquired in consequence of the better purification of the gas.

(*To be continued*)

I.C.I. Expansion in Australia

According to the Australian Trade Commissioner here, the Imperial Chemical Industries of Australia & New Zealand, Ltd., has decided to extend its alkali works at Osborne, South Australia, at a cost of more than £1,000,000. Nearly all the cost of the extensions will be spent in Australia. It is planned to complete the work in two years. The limestone quarries will be extended to permit the extraction of 200,000 tons of limestone a year, and the salt fields, which already cover an area of five square miles, will be extended to provide for the 200,000 tons a year capacity of the new plant.

LEVER PROJECT IN MALAYA

IT has been disclosed that Lever Brothers and Unilever envisage the construction of a £500,000 factory at Kuala Lumpur, Malaya, for the manufacture of high-quality soaps, margarine and other edible fats. An announcement to this effect was made last week by Mr. Geoffrey Heyworth, the company's chairman, who has recently been visiting the island with two other directors. It is understood that erection of the factory will commence just as soon as permits for the specialised machinery can be obtained in Britain.

An integral part of the plan is the development of Malaya's palm oil industry, in which connection the company has already acquired a 4000-acre estate. About 75,000 acres of the island are at the moment growing oil palms, and Mr. Heyworth thinks that this acreage is capable of being multiplied many times.

OFFICIAL NOTICES

Key Industry Exemptions

The Treasury has made an Order exempting butyric acid, normal and cellulose acetate, from Key Industry Duty for the period beginning September 18, and ending December 31, 1947. The Order is entitled "The Safeguarding of Industries" (Exemption) (No. 6) Order, 1947, and is published as Statutory Rules and Orders, 1947, No. 1960.

Flavouring Essences

The Minister of Food has made an Order revoking the Flavouring Essences (Current Prices) Order, 1943, from September 23, 1947, and from that date the selling prices of flavouring essences will no longer be subject to control. This step has been taken as a result of improvements in the supply of the main ingredients.

Tung Oil

The Board of Trade announces that from October 1 tung oil will revert to private trade. The Control of Drying Oils Order, however, remains in force, and general licences from the raw materials department, Board of Trade, will still be required by those dealing in or consuming tung oil.

Obituary

MR. JOHN ANDERSON KIRKWOOD, managing director of Allan Kirkwood, Ltd., lime manufacturers, Nitshill, Glasgow, died at his home, 7 Marywood Square, Glasgow, S.1, on September 17. Mr. Kirkwood had been associated throughout his working life with the family firm, and was very well known in the industry. He is survived by Mr. Ramsay Kirkwood, a brother, also a director of the firm, and a son, Mr. John Kirkwood.

MORE PLANT FOR CHEMICAL INDUSTRY

SPEAKING last week at the 40th ordinary general meeting of Peter Brotherhood, Ltd., Mr. A. M. Neal, the chairman, said that the company had orders in hand for gas compressors, chemical plant, refrigerating machinery, etc., sufficient to occupy them for many months to come. In common with industry generally, however, "the absence of adequate supplies of materials tends to build up a large volume of unfinished work," he added.

With regard to the export drive, Mr. Neal said that in conformity with the Government's wishes, the company had given priority to the class of work which had a bearing on that subject or on the establishment of new industries in Britain. "Indeed," went on Mr. Neal, "we intend to continue to place a large proportion of the facilities to which I have referred at the disposal of the chemical industry. At the moment, some 75 per cent of the work in hand is for export direct, or for use in connection with manufactures intended for the export market."

NEXT WEEK'S EVENTS

WEDNESDAY, OCTOBER 1

Society of Chemical Industry (Glasgow Section). Central Hotel, Glasgow, 6 p.m. E. W. Tennant: "Tennant Memorial Lecture."

Society of Public Analysts and Other Analytical Chemists. Burlington House, Piccadilly, W.1, 6 p.m. Bernard H. Howard: "The Determination of Small Amounts of Hexachlorocyclohexane (Benyene Hexachloride)"; J. H. Skelton and E. D. Wills: "Iodimetric Methods of Estimating Peroxide Oxygen"; B. Bagshawe and J. D. Hobson: "A Study of the Cobalt-Ferricyanide Reaction, With Relation to the Determination of Cobalt in Steel."

THURSDAY, OCTOBER 2

Oil and Colour Chemists' Association. The Royal Institution, 21 Albemarle Street, W.1, 6.30 p.m. Sir Lawrence Bragg: "A Review of Recent Advances in X-Ray Analysis."

The Chemical Society. Burlington House, Piccadilly, W.1, 7.30 p.m. Professor F. G. Donnan: "Ernst Julius Cohen Memorial Lecture."

FRIDAY, OCTOBER 3

Society of Chemical Industry. (Manchester Section). Engineer's Club, 17 Albert Square, Manchester, 6.30 p.m. Sir Percival J. Griffiths: "India and the Future."

Oil and Colour Chemists' Association

LONDON SECTION MEETING

AT the first meeting of the London section of the Oil and Colour Chemists' Association this session, held at Manson House, 26 Portland Place, W.1, on Thursday, September 18, Mr. David E. Roe, delivered his address as chairman of the section.

At the beginning of the meeting the members observed a period of silence in memory of the late Mr. Peter Hewitt, who died in August after a long illness. The chairman paid tribute to him as a man who undoubtedly would have gone a long way in the industry. He was an intensely likeable man, his scholarship was of the highest level, and he had in him all the qualities that made him a good fellow and a good chemist. His loss was indeed a serious blow to the association and the industry.

Mr. Roe said that although he had been actively engaged in the affairs of the London section for some years past, the honour that was now paid him had caused him to examine the activities of the section far more closely and more critically than he had ever done before.

World-Wide Connections

It was the privilege of the London section to be the largest in a rapidly growing association, he said, which had world-wide as well as national ramifications. It was fitting at the first meeting of a new session to send warm greetings to the other sections, to Manchester and Scotland, to Bristol, Hull and Newcastle, and to the overseas section, whose membership included some of the most distinguished scientists in the industry in practically every civilised country in the world. London would also like to send good wishes to the youngest section, in Australia.

It was more than probable that before long a South African section of the association would be formed. It was his earnest hope that, before many years had passed, there would be brother sections in most of the countries of the Empire.

It was also very gratifying to know that, thanks to the inspiration and foresight of Dr. H. W. Keenan on this side, and Dr. Joseph Mattiello in the great American Republic, a close and happy liaison had been effected between the association and the American Federation of Paint and Varnish Production Clubs. Such contacts strengthened and increased the value of both bodies and served to put in their proper place the very small but very noisy minority on both sides of the Atlantic who seemed to think that tail twisting was the most desirable object in life.

After emphasising the great importance of maintaining the closest liaison with other scientific associations and other organisations serving the industries, and of giving the polytechnics as much help as possible, Mr. Roe discussed the human side of affairs and said he always liked to keep well in mind that if we were 5 per cent chemists we were 95 per cent ordinary common or garden human beings. As chemists, trained in the scientific method, we could lay claim to no special faculty which enabled us to solve all problems with greater competence than the rest of mankind. If a criticism were to be levelled at many of them it might well be that they concerned themselves with their own professional affairs to the exclusion of most other activities. Undoubtedly there was a need for many chemists to withdraw from themselves.

In a discussion which followed the chairman's address, Mr. Neil R. Fisk recommended publication of more information concerning the investigations that were proceeding, and quicker publication. Various O.C.C.A. investigations were proceeding, and he would welcome the publication of interim reports with regard to them, to create and maintain more interest.

Wider Knowledge Urged

Mr. R. F. Baker, emphasised the importance of gaining knowledge on subjects other than chemistry. One heard, he said, from time to time that chemists were often ambitious to attain high executive posts. Before they could attain such posts, however, they must not only know how to make the best materials, but whether they were suitable for their purpose, whether they could be manufactured or even whether anybody would have enough money to buy them.

Referring to the co-operative research scheme, Mr. E. Sunderland said that many of the subjects chosen were such that necessarily quite a long period must elapse before reasonable results became available for publication, and that might result in lack of interest. Therefore, he suggested that some smaller scale research might be attempted. Members might suggest from time to time quite small pieces of work which could be done perhaps in two or three weeks by one or two laboratories, so that the results would soon become available.

To Dr. R. F. Bowles it seemed that a strong case could be made out for running two rather sharply differentiated sorts of meetings in the London section. They were bound to have scientific papers; but in addition they might revive the old discussion meetings which were held in London before the war.

British and German Chemical Industries

THE British chemical industry was not consulted directly or indirectly before the scope of postwar German chemical activity was decided at the quadripartite conference in Berlin in 1946. It was, moreover, very difficult today to obtain any precise information about what was happening in the German chemical industry.

These were two of the points made by Mr. J. Davidson Pratt, director of the Association of British Chemical Manufacturers, when recently he addressed the general committee of the Parliamentary and Scientific Committee on "The Future of the Chemical Industry in this Country, with Reference to Competition from Germany."

Not Marvellous Chemists

The Germans, Mr. Davidson Pratt pointed out, were not "marvellous chemists." They were not particularly brilliant and could not claim as high an average of fundamental and original discoveries as this country, but their industry was very much quicker in applying results. I. G. Farbenindustrie with its world-wide ramifications, had been very quick to slip in on any new discovery and ring it round with patents, making it almost impossible for the inventor to develop his invention.

The object of the plan agreed by the Berlin Commission was to eliminate or restrict industries which were regarded as the greatest war potential, but at the same time to allow Germany sufficient capacity to maintain the standard of living, and to export enough to pay for imported food and materials.

In the chemical field, the manufacture of synthetic gasoline, oil, rubber and ammonia were to be prohibited. There was a proviso in the case of ammonia that Germany would be allowed to manufacture sufficient for fertilisers, etc., until she had exports to pay for the imports. Specific war chemicals were prohibited entirely. She was to be allowed 40 per cent of the 1936 capacity of basic chemicals; 20,000 tons of dyestuffs were allowed for home consumption, and she could export dyes as such to the value of Rm. 58 million (approximately £4.7 million) about half her pre-war exports. This is comparable with the British 1946 dyestuff exports of £6.5 million.

In the pharmaceutical field, Germany was to be allowed to make 80 per cent of her 1936 output, of which Rm. 120 million—practically pre-war value—could be exported. This is equivalent to £10 million and is comparable with the U.K. 1946 export of £13 million.

With the shortages of coal, etc., it would probably take Germany five years to reach this level of production, but they were starting to develop, particularly in the pharmaceutical field, where they got a very high return.

The chemical industry felt that in allowing the German chemical industry to be re-established on a 1936 basis, it was re-establishing the industry with the greatest war potential. That war potential was derived not merely from the plant and equipment, but from the great army of technicians of all kinds which it could employ, and which she could use to produce all kinds of things. It would be a menace to future international peace.

It had been hoped that as a result of the Level of Industry Plan a good many German factories other than those specially designed for explosives would be taken for reparations, and a good deal of useful equipment become available. So far, not one piece of chemical equipment had come to this country, in spite of the fact that six teams had been sent out at the end of 1945 and had made recommendations as to equipment to be secured.

Home Industry Prospects

Dealing with chemical production here, Mr. Davidson Pratt said that the industry could never remain static, and was always moving forward. It was seeking better methods and producing new compounds which might revolutionise the world's economy. The President of the Board of Trade had said that the chemical industry provided the highest productivity per worker.

Before 1914 we had a very good heavy chemical industry, but on the organic side—dyestuffs, pharmaceuticals and other fine chemicals—we were in very poor shape. By brilliant but costly improvisation we were able to make our way through the 1914-18 war, with the good result that it was recognised nationally that the chemical industry, particularly the organic chemical industry, was a key industry essential to this country.

Two legislative measures were passed—the Dyestuffs (Import Regulation) Act, which covered dyestuffs, and the Key Industry Duty, which applied to fine chemicals. In connection with the Dyestuffs (Import Regulation) Act, which was appreciated not only by the makers but even more by the users of dyestuffs, it was feared that as a result of the agreement reached at Geneva in regard to abolition of prohibitions, the Dyestuffs Act would have to go, and we should have to take instead a Key Industries system which, though valuable, had not the merits of the Dyestuffs Act.

When the war ended the chemical industry was stronger than it was before, but a lot of the plant and equipment had been worn out. It wanted modernisation, and that was one of the problems on which the industry was very much engaged at the present time.

Chemical Industry Development

Many research results which could not be developed during the war were now being brought to production. Millions of pounds were being spent on schemes for the development of the chemical industry, but apart from the difficulties of coal and steel, they were very badly retarded in their development work through lack of building facilities, plant, etc. Many in the industry felt that at the present time, when there was an imperative need to re-equip our own industries, it was a great pity that plant should be sent overseas to equip other industries to become competitors.

Imports in 1946, allowing for changed values, were about 80 per cent of 1938 imports by volume. Exports in the chemical industry took two forms: (a) the direct export of chemicals themselves; (b) the indirect export, which was even more important, in which chemicals were used—for example, dyed textiles.

The policy now was to see that our home industries were supplied with all the chemicals they needed, before chemicals were exported. In spite of severe restrictions, in 1946 the chemical industry increased its exports more than any other industry, with the exception of vehicles. Their figures, by value, in 1946 were three times the 1938 value, totalling £68 million.

Swiss Instruments Cheaper

In the course of general discussion later, Dr. J. Vargas Eyre deplored the fact that Germany was to be allowed to manufacture synthetic ammonia and urged that British manufacturers should be more fully informed in future upon what else Germany was to be allowed to do. Mr. Davidson Pratt said that the industry had been promised consultations to advise on the handling of German exports, but the arrangement had temporarily broken down because officials had been too busy with inter-zonal problems.

Water Softening Preparations

The Commissioners of Customs and Excise announce that soda types of water softening preparations with colouring or aromatic ingredients, *e.g.*, simple preparations of sodium sesquicarbonate, coloured or containing pine oil, pine compounds etc., are chargeable with Purchase Tax at the rate of 100 per cent of their wholesale value under Class 18 (i) whether or not they are sold as bath salts.

Paint Research Labs.

Anniversary Exhibition of Work

On Monday last, at the invitation of the president and council of the Paint Research Association, technical press representatives attended a preview of the exhibition of work at the association's laboratories at Waldegrove Road, Teddington, to mark the eve of special Twenty-First anniversary celebrations.

To do justice to the exhibition in the course of an afternoon, would be to accomplish the near-impossible. An entire day could be spent in the physics division alone, for there were many new scientific devices to see and to examine, and more than a few "old friends" such as the Redwood Viscometer, and the Ford Cup with which to become reacquainted. There were many new and old experimental methods for studying colour, durability, and the general physical properties of coating materials and compositions. Apparatus displayed included the electron microscope, spectrometers, and ultrasonic equipment.

Chemical Division

Of special interest was the chemical division where our representative witnessed a demonstration of the flame-retardance test, and the resistance of paints to heat. Other apparatus in the same room had application for micro-biological inflammability, film-forming, and degradation tests. In an adjoining room were exhibits illustrating certain aspects of the study of drying oil and of bitumens and bituminous compositions. A distillation column, autoxidation apparatus, and a device for low-temperature crystallisation were particularly interesting.

Of considerable importance to the paint industry at the present time is the question of producing an efficient, reliable, and comparatively inexpensive solvent. That there is plenty of scope for research and development in that direction was evident from the range of solvents displayed. Solvents, in common with linseed oil, are in short supply. Substitutes are being sought for the latter, while new and improved supplies of the former will be equally welcomed. A relatively new solvent, but one that has not so far proved attractive to the industry, is *hydropentanone. Although highly efficient, its production costs are as yet too great to permit of its employment in any but the most essential of applications—and where costs are of no consequence.

Tribute must be paid to the obvious interest and enthusiasm shown by all the laboratory assistants and technicians, while there can be no doubt of the quality and value of the association's work.

OIL-RESISTING RUBBER

Swelling of Rubber and Interaction with Liquids

IN a memorandum by the British Rubber Development Board on oil-resisting rubber, the theory is put forward that for a given rubber the solvent or swelling powers of a range of liquids will depend upon their cohesive energy densities relative to that of the rubber. An " oil-resisting " rubber, it points out, is simply one of high cohesive energy density, while the poor petrol resistance of natural rubber is a result of its low C.E.D.

It is concluded that a rubber cannot be made oil-resisting by physical compounding, but that the chemical structures likely to give oil-resisting rubbers can be predicted with some confidence.

The Rubber Molecule

The memorandum begins by pointing out that a rubber molecule is long and chain-like, possessing a high degree of flexibility. Any selected short section of the molecule, it says, is surrounded by portions of other molecules (or another part of the same molecule). If liquid is present, one or more of the neighbours of the selected section may be a molecule of liquid. All these molecules are in constant motion, by virtue of their thermal energy, the motion becoming more violent as the temperature is raised. The motion is restricted by the existence of strong forces between the molecules; these have the effect of fixing the number of neighbours of the selected section and the average intermolecular spacing within fairly small limits. Within these limits the molecules vibrate; relatively infrequently they separate sufficiently to slide bodily over one another. In vulcanised rubbers a further limit to motion is imposed by the existence of chemical links at certain points, linking them into a more or less compact network.

A piece of vulcanised rubber, dropped into benzene, swells to several times its size, but retains its shape. With raw rubber a further stage ensues, in which the rubber flows and ultimately disperses. Inevitably one tends to form a picture of the rubber attracting and holding the liquid with some strong force. This picture is now believed to be entirely false and an alternative explanation of the phenomena of swelling and solution has been given.

Rubber, from the standpoint of solubility, is a liquid. This may seem surprising, but its mechanical properties make it clear that the rubber molecules have a good deal of freedom to slip past one another, which is just the characteristic that is associated with the liquid state. This, of course, is not a complete description of rubber, but it represents the factor which is important for the present résumé. The absorption of oil by rubber is thus to be regarded as the mixing of two liquids—rubber and oil. The problem to be solved was whether these liquids mix because of their thermal motion or whether there is really some force of attraction between the rubber and the oil.

It is necessary first to consider briefly the way in which simpler materials mix with one another. In a gas the molecules spend most of their time a long way from one another, and the total energy of the system is therefore made up largely of the kinetic energy of thermal motion, in consequence of which the gas molecules tend, on the average, to distribute themselves uniformly, so that any pair of gases mix completely.

In considering the mixing of two liquids another factor becomes important. The molecules of a liquid are close together and therefore exert strong forces on one another. These are measured by the cohesive energy density (C.E.D.), equal to the latent heat of evaporation per c.c. As different liquids do not have the same C.E.D.s it must be concluded that their molecules cohere with different energies. This difference depends partly upon the chemical nature of the molecules and partly on the way they pack together.

Change of Intermolecular Forces

Mixing two liquids involves changes in those intermolecular forces by bringing unlike molecules close together, and these are reflected in the absorption or evolution of heat. It has proved extremely difficult to calculate the magnitude of these changes, but for many types of liquids it is found that the controlling factor is the difference between the C.E.D.s of the two liquids. If these are equal, the liquids mix athermally, the more they differ the larger the *absorption* of heat. This theory thus provides no explanation of exothermal mixing, which is indeed generally to be regarded as evidence of some form of association between the liquids.

This absorption of heat opposes the natural thermal mixing of liquids, and if it becomes large enough leads to separation into two phases.

It will be seen that the sign of the heat change involved in mixing offers very direct evidence as to whether mixing is due primarily to thermal energy or to specific attractive forces. It is not easy to apply this method directly to rubber-liquid systems owing to the difficulties of calorimetric work with rubber. The heat of mixing rubber

with a liquid can be calculated from accurate measurements over a range of temperatures of the vapour pressure of the liquid above mixtures of rubber and liquid. This method has the additional advantage that it enables a quantitative estimate to be made of the thermal mixing tendency, in terms of the thermodynamic function called the entropy. This method has been applied very carefully to the system natural rubber + benzene and shows unambiguously that :—

(a) The thermal mixing tendency (entropy of mixing) is very large;

(b) heat is *absorbed*.

Thus the picture of rubber offering a strong attraction to the oil is completely wrong. Any such attraction would mean that the increase of energy would be negative, and it is found to be positive. Secondly, that the true explanation of the imbibition of oil by rubber is the same phenomenon as underlies the mixing of simple gases and liquids, namely, an increase in entropy brought about by the natural tendency of molecules to mix by thermal motion. The fact that swelling is observed has nothing to do with any attractive forces between rubber and oil; it is rather a visual indication of the extent to which the rubber molecules themselves cohere—only high molecular raw rubber shows either elastic retraction, or swelling, as a prelude to dissolution.

Semi-Quantitative Theory

This way of considering the swelling and solution of rubber has been extended into a semi-quantitative theory. There are reasons for believing that the enthropy of mixing will be nearly independent of the chemical nature of both rubber and liquid, while vulcanisation will introduce a modification which can be calculated from the modulus of elasticity of the vulcanisate. Thus for a given rubber, the solvent or swelling powers of a range of liquids will depend upon their cohesive energy densities relative to that of the rubber. If a series of liquids be selected whose C.E.D.s cover a sufficiently wide range, it should be found that the best swelling agents lie at that point of the range where the C.E.D. is approximately equal to that of the rubber. Rubbers differ in C.E.D., depending on their chemical constitution, and on these differences depends their differing solvent resistance. An " oil-resisting " rubber is simply one of high C.E.D., while the poor petrol resistance of natural rubber is a result of its low C.E.D. It is interesting to note that the order of resistance to acetone is reversed.

The cohesive energy density of rubber is unaffected by compounding. The absolute swelling of a rubber in a good swelling agent is reduced by a reinforcing filler. As no comparable reduction occurs for a bad swelling agent, it appears likely that the effect of the filler is to link the rubber chains together so as to restrict their maximum distension. It is consistent with this view that no comparable effect is found with non-reinforcing fillers.

The only way to change the C.E.D. of natural rubber is by chemical modification, and approximate rules can be drawn up showing the effect of different types of chemical grouping. Thus in principle it would be possible to predict roughly the type of structure needed to produce resistance to a given liquid.

The present theory, the memorandum points out, affords no explanation for the greater swelling power of aromatic liquids compared with aliphatic, but the main factors governing the absorption of liquids by rubber have been outlined, and it is shown how the swelling of a given rubber in a given liquid may be roughly predicted if the cohesive energy density of the liquid is known. A complete quantitative theory is not in sight, but certain conclusions of practical importance emerge: first, a rubber cannot be made oil-resisting by physical compounding; and, secondly, the chemical structures likely to give oil-resisting rubbers can be predicted with some confidence.

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Gas Plant Fire

ON September 17, a wide area of the Ellesmere Port district was shaken by an explosion in the engine room of the Edeleanu gas plant of Lobitos Oilfields. Mr. H. E. Digby-Roberts, plant superintendent, and Mr. A. M. Pillings, chief operator, who received burns and cuts on the hands and head, were saved from more serious injuries by gas masks which are customarily worn in the engine room. The resulting fire was quickly got under control and extinguished. The first fire-fighting appliances to arrive were from Shell's Refineries, followed soon afterwards by the N.F.S. from Ellesmere Port and Port Sunlight. The Lobitos installations, which are themselves extensive, are only one of a number of other refineries and oil tank farms in the same area which together comprise one of the biggest oil centres in the North of England. All permitted fires in the area, such as those in canteen kitchens, were extinguished to minimise the danger.

GLASS IN THE LABORATORY—VI

Cutting Glass Tubing

by I. C. P. SMITH, B.Sc., F.R.I.C.

IN the previous article on cutting glass tubing, the use of the knife was fairly fully described, as well as the aids for producing good cuts from the initial knife mark. The present article collects some of the alternative and mechanical methods, usually confined to works, owing to the high initial outlay.

Diamond Cutters

As the diamond can form one of the cleanest and surest methods of cutting glass tubing, particularly the hard glasses, it is worthy of detailed study. Fig. 1 represents diagrammatically the placing of a diamond on a glass surface at the cutting angle. It is important to note that the cutting part of the diamond occurs actually on the short curved ridges adjacent to the more oblique intersecting angles, there being eight such ridges on each diamond.

When cutting, the curve must rest tangentially on the glass, and the diamond moves to the right. If the diamond has tilted to the left, it digs and forms a white mark which will not form a cut; if to the right it will make a more indefinite mark but also not a cut. A glazier's diamond is set so that the sloping lower end of the holder is approximately parallel to the glass surface; the diamond is drawn towards the operator, who becomes practised in holding it at the correct angle and moving at the optimum speed of some 3 ft. per second.

The production of a true cut is accompanied by a slight vibration, perceptible in the fingers, and a clear note. The cut can be seen immediately by the reflection of light from its sides, and is quite different from the white scratch produced by a diamond held at the wrong angle.

Curved Surfaces

The diamond is sometimes applied to cutting on the outside of tubing or of beakers, necks of flasks, etc., in production, but it is best suited for the cutting of tubing internally, as this face is usually in tension, while the outside is in compression.

For this purpose the diamond is mounted near the end of a steel rod to cut transversely; the rod is inserted in the tubing to the required length and the cut formed by a rolling action. To assist the operator in finding the cutting angle, marks are made on the steel rod opposite the diamond, so that when they are on top the diamond is correctly pointed downwards.

On the round surface of the tube, however, the diamond must be kept at the bottom of the curve, otherwise, when it rides up the curve on either side, the angle of contact becomes incorrect.

Using the hand diamond cutter is therefore a matter of practice but once the knack is acquired the tool is quite reliable. It is best used as in Fig. 2 with the end of the tube against the loose washer, provided the latter is being run against the edge of the bench. The tube is rolled towards the operator by the flat of the left hand, while the right hand draws the diamond along at the same speed as the tube (half the speed of the left hand). This is simpler in practice than it is to describe. It is important that one turn only is given to the tube, as the diamond must not be allowed to run over a cut twice.

Mechanical Aid

Fig. 3 is a machine devised for cutting out most of the difficulties in using the diamond. This has two equal and parallel rollers on which the glass tube may be rotated, and the diamond rod is pivoted so that it moves in a plane forming the right-angle bisector of the line between the axes of the two rollers.

This ensures that once the diamond has been set at the cutting angle by carefully rotating its rod and locking it in its holder, the diamond will always meet the bottom of the bore of the tube. A spring is provided to lift the diamond slightly when not being used.

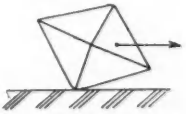


Fig. 1.

In use the diamond is brought down on to the glass surface by gentle pressure of the tips of the fingers of the right hand, the base of the hand being steadied on the board, while the tube is given one turn by drawing the left hand over the top.

So much for the general use of the diamond; it only proves its value and gives long service if some precautions are taken. These are, however, very well worth mastering.

First, the diamond itself: if soda glass only is to be used, then an A or a B quality will suffice, but if the work is with hard glasses, a Star A diamond should be employed. This has a very much longer cutting life than the cheaper diamonds: it can be reset by the makers a number of times and, moreover, it carries much greater

prestige with these artists, who will consequently give very much better care and attention to the tool.

Second, one should study the actions of a glazier in using the diamond. He carefully gets the feel of the cut then draws the tool towards him with an even, firm pressure, and at an even speed.

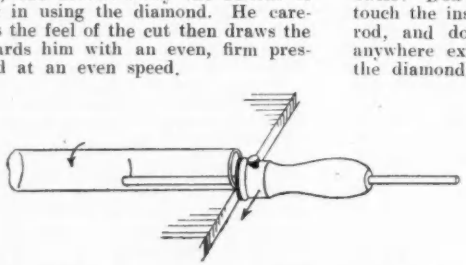


Fig. 2.

In Fig. 2 the diamond is drawn along the bench at this same speed, while the left hand is drawn back at double the speed. In Fig. 3 the left hand is drawn back at the cutting speed, imparting the same relative speed and direction to the cutting edge, independently of the diameter of the tubing. (Theoretically there is a small correction for wall-thickness.) To apply the necessary pressure with the hand-held diamond, a bending action is applied to the handle, the thumb pressing down. In the machine, however, the rod is gripped between the tip of the thumb and upper joints of the first and second fingers, the base of the hand resting on the board. This grip steadies the diamond on the glass, at the same time exerting a steady pressure.

When the diamond is used to cut soda glass a light pressure is all that is required, as the internal wall is usually in a state of tension, and the crack opens up naturally; in the case of hard glass, however, this state of tension though present, is usually only slight, and because the glass is of a physically harder nature, a greater pressure is required. The cut usually forms more easily if the region is first wetted, and if the cut does not immediately travel through, then the outside of the glass should be heated round the region of the cut by a quick spin round in a small gas and air blow-pipe flame.

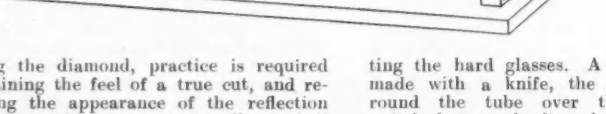


Fig. 3.

Using the diamond, practice is required in obtaining the feel of a true cut, and recognising the appearance of the reflection on the somewhat corrugated walls; and if a diamond is well used in careful hands it will make thousands of cuts on hard glass tubing.

It is well therefore to observe the following don'ts:

Don't run the diamond over the same cut twice. Don't lend your diamond. Don't touch the inside surface of a tube with the rod, and don't touch the diamond point anywhere except when cutting. Don't hit the diamond on the head when it is blunt in order to obtain a fresh cutting edge, send it back to the setter. Don't try to be too ambitious at first; start on soda glass of about 1 in. to 1½ in. diameter, then on hard glass. With practice one can cut up to 6 in. on the machine with a clean quick cut.

Hot Wire Cutting

The hot wire is a length of resistance wire, usually nichrome, of 22 to 18 s.w.g., and brought to a state of redness by means of a low voltage, high amperage current.

One arrangement when A.C. is available is a simple transformer with tappings to give 4 volts or 12 volts at 18 amps., with 6 in. and 18 in. lengths of 18 s.w.g. wire across the terminals respectively. Brass pillars are employed for the terminals.

A small Variac transformer is excellent for this purpose; any selected length of resistance wire can be first wrapped round the tube, and the current turned on until the required redness is produced and a crack formed.

For soda glass a cut with a knife is not required. For cutting small diameter tubes, particularly short lengths, such as Raschig rings which are difficult to hold, the tube is rolled on a short stretched length of the hot wire, and a stop is employed to maintain even length. The longer wire is particularly valuable for cutting the hard glasses. A cut having been made with a knife, the wire is wrapped round the tube over the cut, current switched on, and after about half a minute removed, the tube touched with a wet cloth and a clean crack runs round the tube.

To assist this: 1, the wire may be in a

ready formed loop between the terminals, and pulled tight round the glass. 2, The wire may be fixed in the one terminal only, having a wooden handle (like a cheese wire) at the other end; the wire is wrapped round the tube and hooked under the quick action second terminal. 3, The wire may run between the ends of wooden tongs. It should be remarked that the wire is running at low voltage and may be handled with impunity.

Other Methods

The diamond and the hot-wire methods of cutting glass tubing and rod find their way into the laboratory; the following methods which are employed commercially might however be briefly described here.

The carborundum cutting or slicing wheel is illustrated in Fig. 4 and consists of a rubber bonded carborundum wheel about 10 in. to 12 in. dia. and 1/16 in. thick, carefully mounted to run at a high speed. The tube or rod, backed by a wooden holder, is brought against the wheel by hand pressure, while water jets spray about the cutting region. The action is to cut and fine grind the two ends at the same time. It will cut through a normal 2 in. tube in 2 to 5 seconds and make a clean cut through a bottle or heavy rod.

The steel cutting wheel is a 12 in. tool-steel disc, about ⅛ in. thick brought down to less than 1/64 in. at the edge, and sharpened. It rotates at about 2880 r.p.m. and requires a ½ h.p. motor. Smaller wheels are sometimes employed in mechanical setups.

The wheel is usually mounted under the bench, with just a small segment appearing above the surface. This is mainly protected by a metal cover, with a hinged piece covering the small part which will be used. The tube to be cut is rotated against the wheel, when by friction the glass is actually melted out in the form of a groove. A crack may be started but the line of weakness generally allows the tube to be pulled apart at the cut. This method suffers from leaving a somewhat dirty end, which should not be incorporated in a join.

There is the appearance of a "flame" at the point of contact of the wheel and the tube, and glass is melted away; the shredded fragments usually have the appearance of green bottle glass due to contamination by the iron of the wheel. The cleanest cut is obtained by rotating the glass tube against, not with, the turning of the wheel.

Use of Flame

A method of cutting soda or lead glass, which is in vogue in places such as lamp or radio valve works which handle very large quantities of tubing, is one in which the tube is rotated against a ring of tiny high-temperature flames; it is then immediately rotated against a cold wheel; the latter may be either a steel or a welded carborundum wheel, which also rotates with the glass, so that there is no rubbing action on the glass which might mar the surface. By this means a clean crack off is produced.

This method is applied in multiple machines, cutting a dozen or two dozen small tubes at a time; it is also applied to trimming the ends of tubes of 1½ in. dia.; but in this case the tube, having been heated, rolls over a cold steel surface to produce the crack. The uneven end falls off, while the tube proceeds to the next stage.

Fig. 4. Carborundum slicing wheel.

(by courtesy of Messrs. J. Martin & Son, 14, Jenkins Street, S.E.1)

INSTITUTION OF CHEMICAL ENGINEERS

Successful Manchester Course

A COURSE in chemical engineering design held at the University of Manchester on September 15-17 by the Institution of Chemical Engineers, North-Western Branch, was attended by about 120 chemical engineers.

Professor Graham Cannon, pro-vice-chancellor of the university, who was introduced by the vice-chairman of the branch, Mr. J. McKillop, opened the course and welcomed the delegates. He spoke of the transfer of chemical processes from the small to the large scale and, as many of the processes were instituted in the laboratories of a university, it was fitting that the institution had decided to hold a course in chemical engineering in a university.

The principles of chemical engineering design were illustrated by notes on "The Production of Ortho and Para Mono-Nitro-Toluene from Toluene." The notes were presented and explained by: M. B. Donald, M.Sc.; C. H. Bowden, B.Sc.; J. M. Coulson, M.A., Ph.D.; F. Rumford, B.Sc., Ph.D.; F. E. Warner, B.Sc.

Problem Conditions

In his introduction of the problem, Mr. Donald gave the conditions to which the problem conformed, *i.e.*, that the data regarding it should be easily available in the scientific literature, that the reaction should be practically instantaneous and that no special experience was necessary in order to solve the problem. The problem was not posed with the object of producing the product in a commercial form at the lowest cost, it was not a commercial solution to the problem of the manufacture of mono-nitro-toluenes, in fact several pieces of plant had been included with the object of illustrating the principles of their design. The object of the research is to prepare a compound and the chemical engineer has to decide on one of a number of methods of preparation of the compound; some of the methods available to the chemist may present insuperable difficulties to the chemical engineer, therefore Mr. Donald recommended that the research chemist should have some knowledge of chemical engineering principles.

The notes included the preparation of the flow sheets, the physical design of the plant, the plant schedule, the materials of construction, the plan of operation, safety measures, and instrumentation. These items were discussed and the lecturers also gave informal talks on the general principles underlying some subjects, *e.g.*, heat transmission and instrumentation in chemical plants.

BETTER TELEPHONE FACILITIES

Bouverie House Development

A NEW private branch exchange has been installed at Bouverie House, Fleet Street, London, head office of Benn Brothers, Ltd., publishers of THE CHEMICAL AGE, and other journals.

The new installation, which provides sixteen exchange lines, five external private lines, and a hundred internal extensions, will give greatly enhanced accessibility to the advertising and editorial services of the organisation. Officially designated as "Section Switch P.M.B.X. No. 1A," the new equipment has three operating positions, separate apparatus racks, and a power plant.

Apart from THE CHEMICAL AGE, the other journals of the Benn group which will benefit from the new telephone exchange include the *British Trade Journal, Cabinet Maker, Electrician, Fruit Grower, Gas World, Hardware Trade Journal, Industria Britanica, Leather Trades Review, Miller, Newspaper World, Nursery World, Textil,* and *Timber Trades Journal.*

The Importance of Research

ADDRESSING the 48th annual general meeting of the Calico Printers' Association, Ltd., last week, Mr. R. M. Lee, chairman, said that the Association had long been convinced of the importance of research, and despite the difficulties involved in obtaining the services of trained scientific personnel, it was intended to pursue a policy of expansion and development in that direction. While trade research organisations would be supported, the Calico Printers were firmly of the opinion that the best results could be achieved only by energetic research by individual firms.

As an instance of successful individual research, Mr. Lee drew attention to the Association's new artificial fibre "Terylene," at present being developed by I.C.I. for which he forecast a not insignificant future.

(*Continued from previous column*)

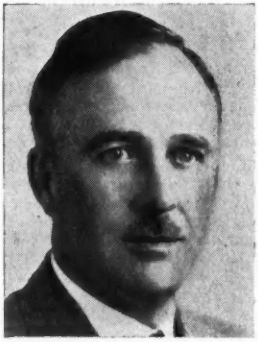
The course was an undoubted educational and social success, thanks to the lecturers and the University of Manchester which generously placed accommodation and equipment at the disposal of the North-Western Branch.

It is hoped that the notes on the problem will be made available later at approximately one guinea per copy by the Institution of Chemical Engineers, 56 Victoria Street, Westminster, London, S.W.1.

U.S. CHEMICAL CONGRESS

DR. L. H. LAMPITT DESCRIBES BRITISH CHEMISTS' DIFFICULTIES

ELEVEN thousand chemists and chemical engineers from all parts of the United States and several foreign countries were in New York last week for the 112th national meeting of the American Chemical Society. It was the largest gathering in the history of the chemical profession, and because of this, meetings had to be allocated to some of the city's leading hotels in addition to those held at the Engineering Societies Building, 29 West 39th Street, N.Y.



Prof. W. A. Noyes

Dr. L. H. Lampitt

The principal British representative was Dr. Leslie H. Lampitt, president of the Society of Chemical Industry, who spoke on "totalitarian planning" at a joint meeting of the Society's American and Canadian Sections and the New York Section of the American Chemical Society, and later spoke at a luncheon of the Agricultural and Food Division.

When the congress ended last week-end nearly 1000 technical papers had been presented at sessions of the Society's eighteen professional divisions, according to Professor W. Albert Noyes, Jr., president of the Society and head of the department of chemistry in the University of Rochester, N.Y.

Recent research on rocket and jet fuels and progress in nuclear and radiation chemistry and many other fields, including plastics, synthetic rubber, and textiles, were reported. Reports were also made on the manufacture of synthetic gasoline and oil from coal and natural gas, and on developments in the production and refining of petroleum.

At a general meeting of the Society held in Manhattan Centre last week, seven outstanding scientists were honoured. The Priestley Medal, highest award in American chemistry, was conferred upon Professor Warren K. Lewis, of the Massachusetts Institute of Technology, for distinguished services to chemistry. Professor Lewis spoke on "The Kinetics of the Reactions of Steam and Carbon Dioxide with Carbon."

At the same meeting, Professor Glenn T. Seaborg, of the University of California, co-discoverer of plutonium, and a member of the general advisory committee of the United States Atomic Energy Commission, received the $1000 American Chemical Society Award in Pure Chemistry, given by Alpha Chi Sigma, national chemical fraternity, for his achievements in nuclear science. Professor Seaborg delivered an address on "Nuclear Transformations in the New High Energy Ranges."

Others who received awards at this meeting were: Professor Mary L. Sherrill, head of the department of chemistry, Mount Holyoke College, to whom went the Francis P. Garvan Medal for women chemists; Professor Van R. Potter, of the McArdle Memorial Laboratory for Cancer Research, University of Wisconsin Medical School, recipient of the Paul-Lewis Laboratories Award in Enzyme Chemistry; Dr. George C. Supplee, head of the G. C. Supplee Research Corporation, Bainbridge, N.Y., who received the Borden Award in the Chemistry of Milk; Dr. Sidney P. Colowick, of the Public Health Research Institute of the City of New York, given the Eli Lilly & Company

Award in Biological Chemistry; and Dr. Louis Schmerling, of the Universal Oil Products Company, Chicago, Illinois, who was awarded the new $3000 Ipatieff Prize for achievements in the field of catalysis.

Totalitarian Planning

Speaking before a joint gathering of American and Canadian chemists, Dr. Leslie H. Lampitt said that totalitarian planning will not solve the British economic crisis. Declaring that one of the major obstacles to revival of competitive production by Great Britain is the obsolescence of her machinery and technological processes, and that under present conditions of economic austerity it is difficult to see how modernisation can be accomplished, Dr. Lampitt said: "In capitalistic as well as in govermental circles this is well recognised, but we cannot all agree that totalitarian planning will lead to the desired solution."

The inadequacy of such planning, he said, was demonstrated by Germany in the food industry where, despite the vaunted efficiency of German plans, the Germans "rather lagged behind than led in the race for supremacy." In the field of science and technology, he doubted whether the Labour Government could carry out the Prime Minister's promise to speed up the practical adaptation of laboratory discoveries. "He is not the only minister who has spoken this way and one has felt the suggestion that in the past there has been some malevolent force at work which has prevented that speedy application of new knowledge," Dr. Lampitt said.

"I do not subscribe to the idea that you can run before you can walk. Many people on this side have suggested to me that that is what we are trying to do in England to-day. It is said that we are witnessing schemes being put on the production lines straight from test-tube experiments, and that no tests on a pilot plant have been conducted. Those of us who have been concerned with the application of laboratory work to industry know the usual fate of processes which are put into application without thorough test."

Directed Research

He particularly deplored a growing trend in England toward directed, or "planned," research undertaken with a definite practical objective. Asserting that the innate curiosity of man to explore the unknown should remain the mainspring of investigation, he pointed out that penicillin, synthetic vitamins, the preparation of hormones, and even the splitting of the atom were the result of curiosity rather than of research conducted toward a practical end.

The spirit of inventiveness and investigation that marked the enormous contributions of British scientists to victory in World War II still exists, Dr. Lampitt asserted, adding: "You remember, possibly, a sentence in one of Mr. Churchill's stirring speeches concerned with the fighting on the beaches, etc. —that spirit is still evident in 1947."

There was, however, an all-pervading feeling of frustration because of the lack of materials. In education, he noted, although no other government has been so lavish in its allocation of money to training establishments, construction of buildings and apparatus was held up by shortages of materials and manpower.

In view of the new food-rationing orders and other restrictive regulations, he said, "it would appear that the sub-normally fed scientists would again have to work short hours in order to conserve both light and heat, and will have to spend valuable hours in their badly lighted and insufficienty heated homes." Exchange of scientific information in England was greatly hampered by the paper shortage which delayed and sometimes prevented publication of important reports.

One of the most evident results of the war was that Britain had had "by far the worst end of the stick." Whether our present doctrinaire leaders are best fitted in their experience of affairs, both internal and external, to deal with the crisis is a matter of opinion," he said.

Natural Products

One development in British science which Dr. Lampitt emphasised was the increased attention being given to natural products by organic and physical chemists. This is a change of far-reaching importance, he said, predicting that the study of biological and physiological processes with the attendant advantage to mankind will proceed with ever-increasing impetus. Concluding, he said he doubted that peace would ever come to the world as long as materialism holds sway, and he called upon American contemporaries to denounce materialism and dedicate themselves "to the betterment of the world, with the recognition that only as we observe religious and moral precepts shall we achieve our worthy object."

Among the many technical papers of contemporary importance was a study of synthetic production of liquid fuels contributed by Dr. A. R. Powell, associate director of research of the Koppers Company, Pittsburg. Current demand for such fuels far exceeded demand in the years immediately preceding the world war, he said, and would continue to increase. The search for inexpensive synthetic substitutes from coal, natural gas, and other materials was being pushed aggressively and he predicted that low-cost synthetic petrol and oil would be manufactured on a large scale in America within the next decade.

Prof. W. K. Lewis
(left)

Prof. G. T. Seaborg
(right)

PERSONALITIES OF U.S. CHEMICAL CONGRESS

Some of the 11,000 chemists who took part in the U.S. Chemical Congress in New York last week are featured on this page. Professors Lewis and Seaborg (above) and Dr. L. Schmerling (left) and Professor Mary Sherrill (right) were all honoured by the Society. Drs. Egloff and Powell (below) contributed important papers to the Congress.

Dr. H. R. Powell
(right)

Dr. G. Egloff
(left)

LETTER TO EDITOR

River Pollution

DEAR SIR,—I have read the article entitled "River Pollution" (Effects of Chemical Works on Fisheries) in THE CHEMICAL AGE dated September 13, 1947. It is interesting, but to me was inaccurate in one respect. It is common knowledge in the whole of this area that few, if any, salmon have been found in the Tees since June, 1932, because of the evil effects of pollution in the river. It may be that the remark to the effect that 1600 salmon are found in the Tees yearly refers to a period of time considerably *before* June, 1932. If this is so, should it not have been stressed in the article?

I would, however, esteem it a favour if you would kindly inquire of the author as to how he arrives at the figure 1600, *i.e.*, in the context:—

"The Tees *now yields* about 1600 salmon a year compared with its little neighbour the Esk," etc., for it seems to me this number is excessively high.—Yours faithfully,

(Sd.) ROBERT H. CLAPHAM.

6 Reeth Road,
Middlesbrough.

Our correspondent writes:—

I have a note in a list of salmon reports that in 1934 the Tees mouth returned 1648 salmon from the nets and 1083 migratory trout, making a total of 25,386 lb. Compared with this the Esk produced 3093 salmon and 3896 trout weighing 49,611 lb. I visited the Tees valley and Tees mouth on several occasions in 1943 and 1944, when I was at Darlington. Admittedly the preponderance of net-caught salmon and the paucity of rod-caught fish shows how few got up the river. In 1927 I have a note that the Tees produced 3892 net salmon and 119 rod salmon, total weight 3246 lb. At the Tees Fishery Board meeting at Darlington, September 25, 1944, a recommendation of the Standing Committee was adopted that a report be made on what steps could be taken to restore the river to its former status as a salmon river.

Danish Trade Mission

Talks were held in London on Tuesday and Wednesday last between members of a Danish Trade Mission and representatives of the Federation of British Industries. Chemical and steel interests were represented by Mr. J. Davidson Pratt (A.B.C.M.) and Mr. R. C. Smith (B.I. & S.F.).

The purpose of the meeting was to review economic conditions in Britain and Denmark, and to discuss practical problems facing trade between the two countries.

SCOTTISH RIVER POLLUTION

RIVER authorities, sanitary officers, and public health officials, in Scotland are pressing for a survey of river and coast pollution in Scotland. For many years periodic disputes regarding industrial effluent and its effect on Scottish rivers have disturbed county authorities and industrial concerns, but even now a considerable degree of uncertainty exists as to individual rights and responsibilities.

There is also an increasing feeling in Scotland that major progress is overdue in sanitation methods in many areas, and that valuable by-products are now being wasted. The Ayr County Chief Sanitary Inspector has issued a report condemning the pollution of Ayrshire rivers and coast lines resulting from unenterprising sewage disposal.

Abuse of many such areas and the continuing use of crude sewage systems has also been commented on, with an appeal that modern sewage works be initiated, which could provide valuable income from fertilisers and other by-products.

Action is being taken by Glasgow Corporation to eliminate the alkali scum which at present covers the River Kelvin, and which was the subject of a recent reproach in a Scottish broadcast. This scum, the Lord Provost has indicated, comes from a paper mill outside the city boundaries, and the only method of eliminating the scum is to stop manufacturing paper. The Corporation of Glasgow is now working on an experiment to erect scum boards or screens. Four traps of this nature are planned for the main city area and one has already been installed. The alkali will be trapped, diverted to a side recess and dissipated by water jets.

World Fibre Shortage

According to the World Fibre Survey drawn up by the Food and Agriculuture Organisation of the United Nations, world production of the five major household fibres—cotton, flax, hemp, silk, and rayon—in 1946-47 was 24 per cent below the 1934-38 average. In 1947-48, the Survey asserts, production will be a little higher, but still considerably less than before the war. The situation is attributed to manpower shortages, and lack of fuel, power, and chemicals.

Minerals Industry.—A meeting of the American Institute of Mining and Metallurgical Engineers will be held in Denver, September 28 to October 3, 1947 to discuss current and future developments in the mineral industry. It will embrace the manifold problems of the petroleum industry as well as mining and concentration of ores and will indicate future trends.

Home News Items

Patent Fuel Manufacture.—The Minister of Labour has published special regulations (Form 1032) relating to patent fuel manufacture. This form can be obtained from H.M. Stationery Office, price 3d.

Exhibition Extension.—In view of the success and continued popularity of "Enterprise Scotland" exhibition, its organisers have decided to extend it beyond the original closing date of September 30. It will now remain open at least until the middle of October.

Ellesmere Port Fire.—Called to a fire which broke out at the British Aromatic Company's works in Cromwell Road, Ellesmere Port, on September 20, the N.F.S. had to wear breathing apparatus owing to the poisonous fumes given off by cyanide residue which had become ignited through contact with a gas ring.

Penicillin Exports Cut.—U.K. exports of penicillin are to be reduced to help supply the continuing unsatisfied home demand. The Ministry of Supply, announcing the decision this week, states that present exports represent approximately 40 per cent of production and are temporarily to be reduced immediately to 30 per cent of production—which is increasing rapidly.

Winter Coal Prospects.—Industrial undertakings are to be notified by November 1 the amount of fuel they may "reasonably expect" to receive during the winter. Mr. Hugh Gaitskell, Parliamentary Secretary, Ministry of Fuel, announcing this last week, said that peak output would be called for from electricity undertakings and there would be no shedding of loads "unless circumstances were wholly exceptional."

New Glassworks in Falkirk.—Falkirk is to have a new glasswork industry in the near future, according to Provost Peter Simon, of Falkirk. As a centre of the light castings industry, Falkirk has also coal deposits adjoining and a considerable labour potential for lighter industries. No details are yet available as to the interests involved or the particular type of glassware which will be produced.

I.C.I. Factory's Role.—The former explosives factory at Powfoot, Dumfriesshire, is being converted by I.C.I. for the production of pentaerythritol, a wartime high explosive now used extensively in the paint industry, replacing to a large extent glycerine and other scarce ingredients. This is one of several conversions which have been carried out in Scotland by I.C.I., under the policy of re-adapting wartime plants and products to peacetime purposes.

Monsanto Golf Tournament.—Members of the Monsanto Golfing Society recently held a tournament at Brookman's Park Golf Club. The four-ball bogey competition was won by F. S. Mortimer and G. Dodd, while the match between the captain's and the secretary's teams was drawn.

Brown (Off-the-Ration) Coal.—Small consignments of brown coal, mined in Devon primarily for the production of wax and resin by-products, are shortly to be despatched to Manchester, where it will be given a trial as an off-the-ration fuel. It is understood that owing to high carriage expenses it will be sold at about £5 a ton.

Zirconal Ltd.—Zirconal Ltd., formed in conjunction with Silicon (Organic) Developments Ltd., 11 Cavendish Place, London, W.1, is to maufacture synthetic mullite and zircon refractory compounds, using the Silester bonding process. The firm is equipped to make semi-permanent moulds and dies, crucibles, furnace equipment, electrical and similar components.

Falling Coal Figures.—Total production of saleable coal in the week ended September 6 was 3,620,700 tons (against 3,784,800 a year before) and the provisional figure for the following week showed a further reduction to 3,581,000 tons. Tonnage lost through disputes, holidays and transport difficulties totalled in the latter week 317,200 tons, compared with 69,800 tons in the corresponding week in 1946.

Heatherwood Production.—It is understood that the Scottish Co-operative Wholesale Society anticipates the production of heatherwood—a resin bonded synthetic hardwood, constructed from the denuded roots of aged heather, compressed under power and cut from the solid into veneers—in early December. This is the process which the Co-operative Society secured from the Dutch patentee and which they anticipate will allow a maximum adoption of the material for a wide variety of purposes.

Coke-Oven Agreement.—Under an agreement made between Simon-Carves Ltd., of Cheadle Heath, Stockport, and the Otto-Wilputte Oven Construction Co., of Holland, the two companies will collaborate in technical work on coke-oven construction. They are to co-operate in big coke-oven contracts in Europe and territories outside Britain and the Empire. The name of the Dutch company has been changed to Otto-Simon-Carves N.V., and Mr. D. T Barritt, a director of Simon-Carves Ltd., and the head of their coke oven and coal washery business, has been appointed to the board.

Personal

MR. G. R. FISHER has been appointed a director of the Zinc Corporation.

MR. W. D. WHEELER has resigned his directorship of Rhodesia Broken Hill Development. His successor on the board is MR H. F. OPPENHEIMER.

MR. D. J. CARLISLE, director/secretary of James H. Dennis & Co., chemical manufacturers, is to retire next week. He is to be succeeded by MR. HERBERT HUTCHINSON.

MR. H. G. TAYLOR has been appointed Director of Research of the British Welding Research Association in succession to MR. A. RAMSAY MOON.

DR. KURT HELLER, a physical chemist at the former German University of Prague, died recently in Berne, Switzerland, at the age of 49.

LORD MELCHETT, who resigned his directorship of I.C.I. in July of this year owing to ill-health, is at present recuperating at Culworth, Northants, following a recent operation.

MR. ROBERT HENDRY, B.Sc., of Bathgate, has been appointed senior lecturer in Chemical Engineering at the Royal Technical College, Glasgow, where he will commence duties in January. Mr. Hendry is a graduate of Glasgow University.

MR. G. P. HOFF, formerly director of the acetate research section of E.I. Du Pont de Nemours & Co., has been appointed assistant manager of the technical division of the rayon department, Wilmington, Del., U.S.

MR. GEORGE WOOD, deputy chairman and joint managing director of Thomas W. Ward, Ltd., has been presented with a gold wrist watch by the staff of that company to

From left to right: Mr. F. R. Stagg, Mr. F. A. Shirt and Mr. George Wood

commemorate his 50-year period of service. The presentation was performed by Mr. F. A. Shirt, the firm's oldest employee.

GEN. SIR RONALD ADAM, former Adjutant-General, has been appointed chairman of the National Institute of Industrial Psychology.

DR. PER K. FROLICH, a member of the American Section of the Society of Chemical Industry, has been appointed director of research and development of Merck & Co., Inc., N.J., in succession to DR. RANDOLPH T. MAJOR, who is now vice-president and scientific director of the firm.

MR. H. THOMPSON, who has been appointed managing director of British Tanners, Ltd., had been manager of the company since March of this year. MR. ERNEST HEWITT, secretary to the company since 1919 (the date of its inception) has also became a director.

LORD LEVERHULME, who was accompanied by Mr. G. A. S. Nairn, chairman of Lever Bros., Port Sunlight, and other directors, on September 20 laid a wreath on the tomb of his father, the first Lord Leverhulme, at Christ Church, Port Sunlight. The ceremony was in commemoration of Founders' Day.

CAPTAIN C. F. TURNER, F.R.I.C., the assistant city analyst, Liverpool, has retired after nearly 35 years' public service. After working in the Lancashire County Laboratory, Captain Turner joined the staff of the newly-appointed city analyst in 1912, when the city first had its own analytical department. During the 1914-18 war he served in France and, on returning, took the examination, in food and drugs, of the Royal Institute of Chemistry. For many years he was an inspector in the Special Constabulary, but during the last war he resigned to become a Gas Identification Officer, feeling he could thus do work of greater value, and during the greater part of the war he ran this service in the city.

DR. W. D. SCOTT, chief chemist of Monsanto Chemicals, Ltd., and DR. J. W. BARRETT, the same company's exploratory research superintendent, left for America yesterday to study the research activities of the Monsanto Chemical Company in the U.S.A. where they will visit eight of the thirty-two American Monsanto plants, including the Dayton Central Research Division. The purpose of the visit is to integrate the research activities of the British and American companies during the next five years, an objective which will be facilitated by the early completion of new £100,000 research facilities at Ruabon, North Wales. Dr. Scott and Dr. Barrett will also make a general survey of the many new products and processes now being developed by Monsanto in America to determine whether there are any likely to be of value to British chemical economy.

Overseas News Items

Colombian Petroleum.—The output of petroleum in Colombia in January-June, 1947, was recorded at 12,253,000 barrels, against 11,718,000 barrels in the first half of 1946.

Copper Mining in Czechoslovakia.—Propping and safety work is soon to begin in the old copper mines near Krompach. The copper ore from the vein in the neighbourhood of this town produces some of the best Czechoslovakian copper.

Trade Agreement.—The Anglo-U.S. zones of Germany have signed a trade agreement with Hungary whereby the former will send chemical products and machinery to the latter in return for agricultural produce and industrial goods.

Shell to Stay in Rumania.—Reports that the Shell Company was proposing to withdraw from Rumania have been categorically denied in London. "No decision of this character has been taken, and no such step is contemplated" an official of the company is reported to have said last week.

Swiss Dyes for Germany.—A trade agreement which has recently been concluded between Switzerland and the Russian zone of Germany (valid for one year), provides for the shipment of Swiss chemicals and dyes against German finished articles. The possibility of German potash deliveries to Switzerland is also envisaged.

Mexican Oil Agreement.—By an agreement between the Mexican Government and the Mexican Eagle Oil Co., Ltd., compensation will be paid to the company for properties expropriated by the Mexican Government in 1938, providing that British shareholders in the Mexican company will receive "just and equitable compensation."

Australian Chemical Shortage.—Because of the acute shortage of sodium sulphite in Australia, resulting from the earlier prolonged strike at the I.C.I. factory, in New South Wales, which previously supplied all the Continent's requirements, tanners have been paying 200 per cent more for small consignments from Karachi and double the home price for whatever can be had from the U.S.A.

German Pharmaceuticals.—The pharmaceutical manufacturing concern formerly known as Wenderoth at Kassel, U.S. Zone, has taken over the paper factory of Phillip Schnell which is not now in operation. The firm now hopes to increase its production, at present 40 per cent below the prewar level. The Wenderoth company has also resumed contacts with former foreign customers,

Dutch Coal Production.—The Dutch index figure for coal production per working day in August was 75 as against 74 in July. The basis working figure of 100 relates to 1938.

Insecticide Wanted.—A plague of insects is reported to be threatening to destroy about 25 million coffee trees in the State of Sao Paulo, Brazil, where coffee growers estimate their present losses at £1¼ million. No remedy so far tried has proved successful.

Nepheline in Canada.—Production of nepheline in Canada has increased as the result of the installation of a 300-ton mill at its Peterboro mine by American Nepheline Ltd. Almost the entire production is being despatched to U.S. glass and porcelain manufacturers.

Glass-Wool from Germany.—The "Springglas" GmbH. has been registered at Gelsenkirchen-Rotthausen with a share capital of 1 million marks. The company will commence the manufacture of glass-wool, glass rods and glass tubes at the plant of "Delog."

Argentina Suspends Imports.—The effect of Circular No. 821, issued by the Argentina Central Bank prior to the temporary suspension of the issue of exchange permits for all imports, is to withhold any further import quotas during the second half of 1946 for impure aluminium sulphate, lithopone and a number of other goods.

Dutch Oils and Fats.—The Dutch oil and fat industry with the joint help of the United Africa Company and the Unilever group proposes to commence the large-scale production of ground nuts and soya beans in the Netherlands East Indies. A preliminary investigation is to be made on the spot early next February.

Artificial Rain.—Following recent experiments—in Australia and elsewhere—in dropping dry ice on cloud formations to produce rain, the Australian Council for Scientific and Industrial Research is reported to be collaborating with the Royal Australian Air Force in spraying clouds with calcium chloride to the same end.

Treibach Works.—The Treibach Chemical Works, Austria, are producing 4250 lb. of ferro-molybdenum a month as well as considerable quantities of calcium carbide and water-glass. For the production of flints thorium is required and in spite of the importance of this material for atomic energy, the U.S.A. and Great Britain support the flint industry at Treibach by supplying thorium.

Company News

The nominal capital of **Vermex Chemical Co., Ltd.**, 20 Queen Street, Blackpool, has been increased beyond the registered capital of £2000, by £2000, in £1 ordinary shares.

The nominal capital of **Kemmet Trading Company, Ltd.**, chemicals, etc., 8 Greek Street, London, W.1, has been increased beyond the registered capital of £100 by £400, in £1 ordinary shares.

The Aluminium Company of Canada has recently purchased for sinking fund purposes, 21,976 of its 4 per cent cumulative redeemable Sinking Fund preferred shares, partly by tender and partly on the Montreal and Toronto Stock Exchanges.

The nominal capital of **Fairbank Kirby (Wholesale) Ltd.**, chemical manufacturers, etc., 7 Ropery Street, Grimsby, has been increased beyond the registered amount of £6000, by £2000, in £1 ordinary shares.

The Britannia Lead Company announces a dividend of 200 per cent from the profits for 1946, and an interim dividend of 40 per cent from the profits for 1947, both payable on September 25.

The nominal capital of **Barrywald Products Ltd.**, electrical and chemical equipment, etc., 1 Leadenhall Street, London, E.C.3, has been increased beyond the registered capital of £5200, by £1300, in £1 ordinary shares.

Indestructible Paint has raised its interim dividend for 1947 to 10 per cent, less tax, comparing with 7½ per cent paid for several years. For 1946 a final dividend of 22½ per cent brought the total for the year to 30 per cent.

The name of **Bowmans (Warrington) Ltd.**, manufacturing and retail chemists, oil and colourmen, etc., Moss Bank Works, Widnes, Lancs., has been changed to Bowmans Chemicals Limited, as from September 3, 1947.

The nominal capital of **Pharplast Processing and Supply Company, Ltd.**, manufacturers and processers of raw materials for the paint, plastic and fine chemical industries, etc., 143 Cannon Street, London, E.C.4, has been increased beyond the registered capital of £1000, by £1500, in £1 ordinary shares.

The Cementation Company announces a dividend of 25 per cent, less tax, payable to ordinary stockholders on October 10. The dividend recommended is payable on £171,500 Ordinary stock outstanding at March 31, 1947, and in accordance with the terms of issue, is payable on £53,500 of ordinary stock issued subsequently to March 31, 1947. Profits for the year amount to £140,256, compared with £91,382 for the previous year.

The nominal capital of **G. and E. Babey, Ltd.**, creosote manufacturers, Totton, Hants., has been increased beyond the registered capital of £2000, by £3000, in 2000 ordinary and 1000 6 per cent redeemable preference shares of £1.

Murex, Ltd., metallurgists, report a profit for the year ended June 30 of £159,093, compared with £201,490 for the previous year. A final dividend of 10 per cent and a bonus of 2½ per cent is recommended, making 20 per cent in all for the eleventh year in succession.

Peter Brotherhood Ltd., chemical engineers, have announced a net profit (without provision for taxation) of £66,850 as against £70,405 in the previous year. A final dividend of 12 per cent is recommended, which together with the interim of 8 per cent, amounts to 20 per cent for the year.

Lever Bros. and Unilever N.V. have issued a further Fl. 20,550,000 4 per cent redeemable cumulative preference shares in units of Fls. 1000 with the object of providing the company with working capital. A Dutch banking concern has acquired Fl. 8,550,000, while the Fl. 12,000,000 balance has been offered for sale to the public of Holland.

New Companies Registered

Triplex Safety Glass Company has declared an ordinary dividend of 10 per cent, less tax, for the year ended June 30, 1947. This compares with 7½ per cent for the previous year and 15 per cent for the two preceding years.

Boiler Insulation & Chemical Co., Ltd. (441,519).—Private company. Capital £1000 in 1000 shares of £1 each. Directors: C. E. Hall, C. Terlet and R. G. Rodgers. Registered office: 50 Stamford Hill, N.16.

Nu-Chemical Products, Ltd. (441,375).—Private company. Capital £100 in £1 shares. Manufacturers of and dealers in chemicals, gases, drugs, medicines, acids, alkalis, colours, gums, adhesives, pigments and varnishes, etc. Directors: J. Amelan and Kathleen Bowden. Solicitors: Amelan and Roth, 62 Market Street, Manchester.

Controlled Convection Drying Company, Ltd. (441,923).—Private company. Capital £250 in £1 shares. Designers and manufacturers of and dealers in chemical drying, heating, ventilating, air conditioning and allied plant and equipment, consultants on all engineering, industrial or domestic heating and drying problems, chemical manufacturing and processing, etc. Directors: F. Capper and Mrs. Alice Partington. Registered office: 42 King Street West, Manchester.

Robinson and Groom, Ltd. (442,233).—Private company. Capital £1000 in £1 shares. Manufacturers of and dealers in chemicals for bleaching, washing, cleansing and disinfecting, etc. Directors: J. H. Robinson, 269 Selbourne Road, Luton; C. Groom, and C. J. Birch. Secretary: C. J. Birch.

Fuel Analysts & Consultants, Ltd. (442,053). — Private company. Capital £1000 in 1000 shares of £1 each. Samplers and analysers of and consultants and advisers on coal and all other fuels, etc. Directors: M. E. Hughes, E. G. Tabraham, and T. Jenkins. Registered office: 124 Bute Street, Cardiff.

Neura Laboratories, Ltd. (442,325).—Private company. Capital £1500 in £1 shares. Consulting, analytical, manufacturing and general chemists, opticians, manufacturers of and dealers in proprietary articles, etc. Directors: H. J. Kenny and Mrs. Marjorie I. Kenny and Dorien Woodward. Registered office: National Bank Buildings, Fenwick Street, Liverpool.

Tyborite, Ltd. (442,345).—Private company. Capital £1000 in £1 shares. Manufacturers, exporters, importers, retailers and dealers in and processers of plastics, moulding wood and metal materials and compounds, organic or inorganic chemical substances and products natural or synthetic plastic substances, thermo-plastics and cellulose products or bitumen, etc. Directors: J. R. Morris and Ilse Hirschfeld-Jacobson. Secretary: Celia Silverman. Registered office: 409 Kilburn High Road, N.W.6.

Chemical and Allied Stocks and Shares

STOCK markets have been inactive with buyers holding off in view of uncertainty whether there will be an autumn Budget and plans for profit or dividend limitation. It is recognised that, granted export targets are reached, some companies might very well earn record profits, but although "export target" shares have attracted a good deal of attention, gains on balance have been moderate in most cases because of the assumption that the Government may propose some form of dividend limitation. On the other hand, while interest has centred mainly on companies with big export market scope, shares of companies associated mainly with the home market have remained out of favour, and generally the volume of business has been restricted and not sufficient in most sections for any very definite trend to develop. British Funds were also uncertain, sentiment being affected to some extent by Mr. Dalton's forecast of further sales of gold to America.

Chemical and kindred shares received rather more attention in view of export trade expansion hopes, and prices moved higher on balance, although best levels were not held. Imperial Chemical were better at 47s. No change is being expected in the forthcoming interim dividend. The general assumption is that the total payment for the year may be unchanged at 10 per cent, but that in respect of 1948 there may very well be an increase above this rate, granted that export targets are achieved and that there is no scheme of dividend limitation. Moreover, it continues to be assumed in the market that in due course it will be decided to "split" the existing £1 units into four units of 5s. each. Monsanto Chemicals have been more active up to 56s. 6d., while Greeff-Chemicals Holdings 5s. shares have been steady at 15s. 6d. awaiting the interim dividend. B. Laporte were 80s., and W. J. Bush 87s. 6d., with Fisons active around 66s. 3d. The units of the Distillers Co. rose to 136s. 3d. in view of the great financial strength displayed by the consolidated accounts. United Molasses were firm at 47s. 6d., and there was a better tendency among paint shares with Goodlass Wall 36s. 3d., and Pinchin Johnson 55s., International Paint also strengthened to £6¼.

Textiles remained in favour in view of export trade scope, but best prices were not fully held. Bradford Dyers showed a fresh rise to 23s. Calico Printers were 22s. 6d., and Bleachers 11s. 7½d. Courtaulds were 48s., and awaiting the dividend announcement British Celanese displayed activity at the higher level of 27s. Iron and steels showed firmness in view of the industry's good progress and the belief that the upward trend in output is continuing. United Steel were helped by expectations that the dividend will be maintained and have strengthened further to 25s. 9d. Dorman Long were 24s. 6d., Guest Keen 46s. 9d., Babcock & Wilcox 70s. Allied Ironfounders 53s., while Tube Investments rose to £6 3/16. Wm. Cory were good at 94s., and Lambert Bros. 81s. 6d. In other directions, Amalgamated Metal improved to 15s. 10½d., Imperial Smelting were 18s. 7½d., and General Refractories 21s. Moreover, British Aluminium at 45s. 3d. have remained under the influence of the interim dividend and the belief that demand for the metal is continuing to expand. Boots Drug were 56s. 9d., Beechams deferred 23s., and Griffiths Hughes 43s. 9d., while Sangers were 28s., and Timothy Whites 41s. 6d. British Glues & Chemicals 4s. ordinary have been steady at 18s. 9d. Oil shares were unsettled by international political news, Anglo-Iranian continued to fluctuate sharply, although exceptionally, Trinity Leaseholds strengthened, changing hands around 90s.

RISING CANADIAN CHEMICAL EXPORTS

STATISTICS contained in *Foreign Trade* (*II.* No. 34, August 23, 1947) show that during June of this year exports of all groups of commodities (in dollar values) have been tremendously increased compared both with June last year and June, 1938. The following (Table I) is extracted from the table of main groups, the figures representing millions of dollars:

TABLE I

	June '38	June '46	June '47
Chemicals and allied products	1.7	5.2	9.2
Iron and products ...	6.2	24.7	26.4
Non-ferrous metals and products	11.8	17.4	26.8
Non-metallic minerals and products ...	2.3	5.0	6.9

A break-down of the chemicals and allied products group shown in Table II reveals that the most marked increases in that section occurred in the production of fertilisers, paints and varnishes, and "other chemical products," the last-mentioned presumably embracing pharmaceuticals and fine chemicals.

TABLE II

CHEMICAL AND ALLIED PRODUCTS
(Thousands of dollars)

	June '38	June '46	June '47
Acids	119	128	307
Medicinal preparations	115	436	520
Fertilisers	525	2,370	2,936
Paints and varnishes	72	259	1,008
Calcium compounds	42	364	262
Soda and sodium compounds	369	334	333
Chemical products, other	414	1,264	3,802
Total ...	1,654	5,155	9,167

With regard to non-metallic minerals and products, shown in Table III, the figures are consistently and progressively higher for each of the five break-down sections, except for that of coal, which appears to have experienced a setback to the 1938 level.

TABLE III

NON-METALLIC MINERALS, PRODUCTS
(Thousands of dollars)

	June '38	June '46	June '47
Asbestos and products	1,242	2,295	2,824
Coal	124	622	166
Petroleum and products	123	217	881
Abrasives, artificial, crude	280	911	1,071
Non-metallic products, other	484	922	1,939
Total ...	2,253	4,967	6,882

New Chemical Companies

Of the 24,002 new companies registered in this country during 1946, 380 were engaged in the manufacture or distribution of chemicals. The capital involved amounted to £2,202,043. 109 new firms entered the plastics industry with a capital expenditure of £721,170.

PAINT INDUSTRY'S RAW MATERIALS

WRITING in *The Board of Trade Journal* of September 20, Dr. L. A. Jordan, director of the Research Association of British Paint, Colour and Varnish Manufacturers, reviews the work of the association's laboratories.

With regard to new synthetic resins now widely available in the U.S.A. and to some extent also in this country, the author maintains that dependence must be placed on the older paint-making materials, though his reference to "circumstances in Britain to-day" may be taken as a possible hint that he is not entirely unsympathetic to the new products. Linseed oil, Dr. Jordan asserts, must remain the best medium for paints—if adequate supplies are readily available.

Tung oil is another well-known drying oil for which substitutes have been sought, chiefly by manipulation of castor oil—though other oils have been used. Attempts have also been made, according to Dr. Jordan, to find a linseed oil substitute by the same means using semi-drying oils such as soya or rubber-seed oil.

Referring to the paint industry as a whole, Dr. Jordan describes it as largely a chemical process with a highly specialised technology. This, he says, has arisen from even more specialised subjects—surface chemistry of solids, and the physico-chemical aspects of wetting, dispersion and flocculation.

SCOTTISH SEAWEED RESEARCH

THE Institute of Seaweed Research has been established by the Scottish Seaweed Research Association at Musselburgh and was officially opened on September 19.

Pointing to the present wastage of potentially valuable chemicals, Major Philip Jackson, acting director of the association, said that only alginic acid was being extracted from seaweed. For every ton of alginic acid extracted, three tons of potentially useful chemicals were being lost. Steps are being taken to correct this position and new products are promised in the near future, one such being mannitol, used in the plastics industry. The crux of the successful development of this industry and of use of seaweed products in many other industries, is the successful harvesting of the weed. Six methods of collection have been discussed and results are promising, but a fuller survey of mechanical collection methods is essential before success can be claimed.

Among the industries using seaweed products are textiles, adhesives, fertilisers, foodstuffs, fibres, papers, printing inks, medicinal products and varnishes.

Prices of British Chemical Products

THERE is a ready outlet for practically the whole range of industrial chemicals, the market demand continuing strong. In some instances consumers contract delivery specifications are being increased and there is little likelihood of any change in the present firm conditions of the market. Among soda products, there is a steady call for sodium sulphide, sodium bicarbonate and sodium sulphate, while the supply position of soda ash remains difficult. Chlorate of soda continues in good request and the demand for bichromates is in excess of supplies. With the possible exception of permanganate of potash, all the potash chemicals are in comparatively short supply for spot or nearby delivery. The demand for paint raw materials is persistent and prices are firm. The call for oxalic, acetic, tartaric and citric acid is such that offers are finding ready outlet. The only feature of the firm coal-tar products market, virtually unchanged, is the strong demand for pitch for both home and export accounts. No announcement has yet been made regarding the expected upward revision of control prices.

MANCHESTER.—Steady trading conditions have been reported on the Manchester chemical market during the past week. Fresh inquiries from home industrial consumers, including the textile and allied sections, have been numerous and have covered a wide range of both light and heavy chemicals. Actual additions to order books have amounted to a substantial quantity in the aggregate. Shippers have also been in the market and are pressing for supplies for export, the delivery dates in respect of overseas business are not easy to arrange. Throughout the market prices remain on a very firm basis. In the by-products, pitch, crude tar, creosote oil and most of the light materials are going steadily into consumption.

GLASGOW.—Business in the Scottish heavy chemical market has shown little change during the past week, although considerable activity has been observed in synthetic detergents and soap substitutes.

In the export market inquiries continue on a large scale, especially for fertilisers and alkalis, and orders have been booked for potassium nitrate and sulphur. Greece has proved to be an active market these past few weeks, although import licences are seemingly difficult to obtain in that country.

Price Changes

Rises: Barium carbonate, barium sulphate, formaldehyde, hydrogen peroxide, lead acetate, lead nitrate, litharge, magnesite, potassium carbonate, salicylic acid, sodium sulphate, sodium sulphide, barytes, carbon tetrachloride and pitch.

General Chemicals

Acetic Acid.—Maximum prices per ton: 80% technical, 1 ton, £56 10s.; 80% pure, 1 ton, £58 10s.; commercial glacial 1 ton £70; delivered buyers' premises in returnable barrels: £4 10s. per ton extra if packed and delivered in glass.

Acetone.—Maximum prices per ton, 1/5 tons, £86 10s.; single drums, £87 10s.; delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each. For delivery in non-returnable containers of 40/50 gallons, the maximum prices are £3 per ton higher. Deliveries of less than 10 gallons free from price control.

Alum.—Loose lump, £16 per ton, f.o.r. MANCHESTER: £16 to £16 10s.

Aluminium Sulphate.—Ex works, £11 10s. per ton d/d. MANCHESTER: £11 10s.

Ammonia, Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Bicarbonate.—MANCHESTER: £40 per ton d/d.

Ammonium Carbonate.—£42 per ton d/d in 5 cwt. casks. MANCHESTER: Powder, £43 d/d.

Ammonium Chloride.—Grey galvanising, £22 10s. per ton, in casks, ex wharf. Fine white 98%, £21 to £25 per ton. See also Salammoniac.

Ammonium Persulphate.—MANCHESTER: £5 per cwt. d/d.

Antimony Oxide.—£162 10s. per ton.

Arsenic.—Per ton, 99/100%, £38 6s. 3d. to £41 6s. 3d., according to quality, ex-store.

Barium Carbonate.—Precip., £22 per ton d/d; 2-ton lots, £22 per ton, bag packing, ex works.

Barium Chloride.—98/100% prime white crystals, 4-ton lots, £19 10s. per ton, bag packing, ex works.

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £22 per ton d/d; 2-ton lots, £22 5s. per ton.

Bleaching Powder.—Spot, 35/37%, £11 to £11 10s. per ton in casks, special terms for contract.

Borax.—Per ton for ton lots, in free 1-cwt. bags, carriage paid: Commercial, granulated, £30; crystals, £31; powdered, £31 10s.; extra fine powder, £32 10s.

B.P., crystals, £39; powdered, £39 10s.; extra fine, £40 10s. Borax glass, per ton in free 1-cwt. waterproof paper-lined bags, for home trade only, carriage paid: lump, £77; powdered, £78.

Boric Acid.—Per ton for ton lots in free 1-cwt. bags, carriage paid: Commercial, granulated, £52; crystals, £53; powdered, £54; extra fine powder, £56. B.P., crystals, £61; powder, £62; extra fine, £64.

Calcium Bisulphide.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/72% solid, £5 15s. per ton, ex store.

Charcoal, Lump.—£25 per ton, ex wharf. Granulated, £30 per ton.

Chlorine, Liquid.—£23 per ton, d/d in 16/17 cwt. drums (3-drum lots).

Chrometan.—Crystals, 5½d. per lb.

Chromic Acid.—1s. 10d. to 1s. 11d. per lb., less 2½%, d/d U.K.

Citric Acid.—Controlled prices per lb., d/d buyers' premises. For 5 cwt. or over, anhydrous, 1s. 6¼d., other, 1s. 5d.; 1 to 5 cwt., anhydrous, 1s. 9d., other, 1s. 7d. Higher prices for smaller quantities.

Copper Carbonate.—MANCHESTER: 1s. 7d. per lb.

Copper Oxide.—Black, powdered, about 1s. 4½d. per lb.

Copper Sulphate.—£44 12s. 6d. per ton f.o.b., less 2%, in 2 cwt. bags.

Cream of Tartar.—100 per cent., per cwt., from 201s. to 205s. per cwt. lots, d/d.

Formaldehyde.—£28 to £29 per ton in casks, according to quantity, d/d. MANCHESTER: £29 10s.

Formic Acid.—85%, £54 per ton for ton lots, carriage paid.

Glycerine.—Chemically pure, double distilled 1260 s.g., £6 per cwt. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 7s. 6d. to 8s. 9d. per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Hydrogen Peroxide.—1s. per lb. d/d, carboys extra and returnable.

Iodine.—Resublimed B.P., 10s. 4d. to 14s. 6d. per lb., according to quantity.

Lactic Acid.—Pale tech., £70 per ton; dark tech., £60 per ton ex works; barrels returnable.

Lead Acetate.—White, 110s. to 115s. per cwt., according to quantity.

Lead Nitrate.—About £95 per ton d/d in casks. MANCHESTER: £115.

Lead, Red.—Basic prices per ton: Genuine dry red lead, £106; orange lead, £118. Ground in oil: Red, £132; orange £144. Ready-mixed lead paint: Red, £140; orange, £152.

Lead, White.—Dry English, in 8-cwt. casks, £116 10s. per ton Ground in oil, English, in 5-cwt. casks, £141 per ton.

Litharge.—£103 10s. to £106 per ton, according to quantity.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £18 5s.

Magnesium Chloride.—Solid (ex wharf), £27 10s. per ton.

Magnesium Sulphate.—£12 to £14 per ton.

Mercuric Chloride.—Per lb., for 2-cwt lots, 7s. 6d.; smaller quantities dearer.

Mercurous Chloride.—8s. 10d. to 9s. per lb., according to quantity.

Mercury Sulphide, Red.—Per lb., from 10s. 3d. for ton lots and over to 10s. 7d. for lots of 7 to under 30 lb.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 4s. 4d. per gal.; pyridinised 64° O.P. 100 gals., 4s. 5d. per gal.

Nitric Acid.—£24 to £26 per ton, ex works.

Oxalic Acid.—£100 to £105 per ton in ton lots packed in free 5-cwt. casks. MANCHESTER: £5 to £5 5s. per cwt.

Paraffin Wax.—Nominal.

Phosphorus.—Red, 3s. per lb. d/d; yellow, 1s. 10d. per lb. d/d.

Potash, Caustic.—Solid, £65 10s. per ton for 1-ton lots; flake, £76 per ton for 1-ton lots. Liquid, d/d, nominal.

Potassium Bichromate.—Crystals and granular, 9¾d. per lb.; ground, 10¾d. per lb., for not less than 6 cwt.; 1-cwt. lots, ¼d. per lb. extra.

Potassium Carbonate.—Calcined, 98/100%, £64 per ton for 1-ton lots, ex store; hydrated, £58 for 1-ton lots

Potassium Chlorate.—Imported powder and crystals, nominal.

Potassium Iodide.—B.P., 8s. 8d. to 12s. per lb., according to quantity.

Potassium Nitrate.—Small granular crystals, 76s. per cwt. ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 8½d. per lb. for 1-cwt. lots; for 3 cwt. and upwards, 1s. 8d. per lb.; technical, £7 14s. 3d. to £8 6s. 3d. per cwt., according to quantity d/d.

Potassium Prussiate.—Yellow, nominal.

Salammoniac.—First lump, spot, £48 per ton; dog-tooth crystals, £50 per ton; medium, £48 10s. per ton; fine white crystals, £21 to £25 per ton, in casks, ex store.

Salicylic Acid.—MANCHESTER: 2s. 2d. to 3s. 0d. per lb. d/d.

Soda, Caustic. — Solid 76/77%; spot, £18 4s. per ton d/d.

Sodium Acetate.—£42 per ton, ex wharf.

Sodium Bicarbonate.—Refined, spot, £11 per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 8d. per lb.; anhydrous, 7½d. per lb., net, d/d U.K. in 7-8 cwt. casks.

Sodium Bisulphite. — Powder, 60/62%, £19 10s. per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£25 per ton d/d in minimum ton lots in 2 cwt. free bags.

Sodium Chlorate.—£45 to £47 per ton.

Sodium Hyposulphite.—Pea crystals 22s. 6d. per cwt. (2 ton lots); commercial, 1-ton lots, £17 per ton carriage paid. Packing free.

Sodium Iodide.—B.P., for not less than 28 lb., 10s. 2d. per lb.

Sodium Metaphosphate (Calgon).—11d. per lb. d/d.

Sodium Metasilicate.—£18 per ton, d/d U.K. in ton lots.

Sodium Nitrite.—£23 per ton.

Sodium Percarbonate.—12½% available oxygen, £7 per cwt.

Sodium Phosphate.—Di-sodium, £30 10s. per ton d/d for ton lots. Tri-sodium, £35 per ton d/d for ton lots (crystalline).

Sodium Prussiate.—9d. to 9½d. per lb. ex store.

Sodium Silicate.—£6 to £11 per ton.

Sodium Sulphate (Glauber Salt).—£8 per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. Spot £4 11s. per ton d/d station in bulk. MANCHESTER: £4 12s. 6d. to £4 15s. per ton d/d station.

Sodium Sulphide. — Solid, 60/62%, spot, £22 2s. 6d. per ton, d/d, in drums; crystals, 30/32%, £15 2s. 6d. per ton, d/d, in casks.

Sodium Sulphite.—Anhydrous, £29 10s. per ton; pea crystals, £20 10s. per ton d/d station in kegs; commercial, £12 to £14 per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £14 12s. 6d. to £16 17s. 6d., according to fineness.

Sulphuric Acid.—168° Tw., £6 2s. 8d. to £7 2s. 8d. per ton; 140° Tw., arsenic-free, £4 15s. per ton;; 140° Tw., arsenious, £4 7s. 6d. per ton. Quotations naked at sellers' works.

Tartaric Acid.—Per cwt., for 10 cwt. or more, £15 8s.; 5 to 10 cwt., £15 9s. 6d.; 2 to 5 cwt., £15 11s.; 1 to 2 cwt., £15 13s. Less than 1 cwt., 3s. 1d. to 3s. 3d. per lb. d/d, according to quantity.

Tin Oxide.—1 cwt. lots d/d £25 10s.

Zinc Oxide.—Maximum prices per ton for 2-ton lots, d/d: white seal, £68 15s.; green seal, £70 5s.; red seal, £71 5s.

Zinc Sulphate.—No quotation.

Rubber Chemicals

Antimony Sulphide.—Golden, 3s. to 4s. per lb. Crimson, 2s. 7½d. to 3s. per lb.

Arsenic Sulphide.—Yellow, 1s. 9d. per lb.

Barytes.—Best white bleached, £8 3s. 6d. per ton.

Cadmium Sulphide.—6s. to 6s. 6d. per lb.

Carbon Bisulphide.—£37 to £41 per ton, according to quality, in free returnable drums.

Carbon Black.—6d. to 8d. per lb., according to packing.

Carbon Tetrachloride.—£50 10s. to £53 10s. per ton, according to quantity.

Chromium Oxide.—Green, 2s. per lb.

India-rubber Substitutes.—White, 10 5/16d to 1s. 5½d. per lb.; dark, 10½d. to 1s. per lb.

Lithopone.—30%, £32 17s. 6d. per ton.

Mineral Black.—£7 10s. to £10 per ton.

Mineral Rubber, "Rupron."—£20 per ton.

Sulphur Chloride.—7d. per lb.

Vegetable Lamp Black.—£49 per ton.

Vermilion.—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.

Nitrogen Fertilisers

Ammonium Phosphate.—Imported material, 11% nitrogen, 48% phosphoric acid, per ton in 6-ton lots, d/d farmer's nearest station, in December £20 4s. 6d., rising by 2s. 6d. per ton per month to March, 1947.

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, in December £9 18s. 6d., rising by 1s. 6d., per ton per month to March, 1947.

Calcium Cyanamide.—Nominal; supplies very scanty.

Concentrated Fertilisers.—Per ton d/d farmer's nearest station, I.C.I. No. 1 grade, where available, £14 18s. 6d.

"Nitro Chalk."—£9 14s. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean super-refined for 6-ton lots d/d nearest station, £17 5s. per ton; granulated, over 98%, £16 per ton.

Coal Tar Products

Benzol.—Per gal. ex works: 90's, 2s. 6d.; pure, 2s. 8½d.; nitration grade, 2s. 10½d.

Carbolic Acid.—Crystals, 11½d. per lb. Crude, 60's, 4s. 3d. MANCHESTER: Crystals, 9½d. to 11½d. per lb., d/d; crude, 4s. 3d., naked, at works.

Creosote.—Home trade, 6½d. to 9¾d. per gal., according to quality, f.o.r. maker's works. MANCHESTER, 6½d. to 9¾d. per gal.

Cresylic Acid.—Pale, 97%, 3s. 6d. per gal.; 99%, 4s. 2d.; 99.5/100%, 4s. 4d. American, duty free, 4s. 2d., naked at works. MANCHESTER: Pale, 99/100%, 4s. 4d. per gal.

Naphtha.—Solvent, 90/160°, 2s. 10d. per gal. for 1000-gal. lots; heavy, 90/190°, 2s. 4d. per gal. for 1000-gal. lots, d/d. Drums extra; higher prices for smaller lots. Controlled prices.

Naphthalene.—Crude, ton lots, in sellers' bags, £8 1s. to £12 13s. per ton according to m.p.; hot-pressed, £14 15s. to £15 14s. per ton, in bulk ex works; purified crystals, £28 to £43 5s. per ton. Controlled prices.

Pitch.—Medium, soft, home trade, 75s. to 80s. per ton f.o.r. suppliers' works; export trade, £7 10s. per ton f.o.b. suppliers' port. MANCHESTER: 77s. 6d. f.o.r.

Pyridine.—90/140°, 18s. per gal.; 90/160°, 14s. MANCHESTER: 14s. 6d. to 18s. 6d. per gal.

Toluol.—Pure, 3s. 2½d. per gal.; 90's, 2s. 4d. per gal. MANCHESTER: Pure, 3s. 2½d. per gal. naked.

Xylol.—For 1000-gal. lots, 3s. 3½d. to 3s. 6d. per gal., according to grade, d/d.

Wood Distillation Products

Calcium Acetate.—Brown, £15 per ton; grey, £22.

Methyl Acetone.—40/50%, £56 to £60 per ton.

Wood Creosote.—Unrefined, from 3s. 6d. per gal., according to boiling range.

Wood Naphtha.—Miscible, 4s. 6d. to 5s. 6d. per gal.; solvent, 5s. 6d. to 6s. 6d. per gal.

Wood Tar.—£6 to £10 per ton.

Intermediates and Dyes (Prices Nominal)

m-**Cresol** 98/100%.—Nominal.

o-**Cresol** 30/31° C.—Nominal.

p-**Cresol** 34/35° C.—Nominal.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8½d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb; 66/68° C., 1s.

p-**Nitraniline.**—2s. 5d. per lb.

Nitrobenzene.—Spot, 5½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.

Nitronaphthalene.—1s. 2d. per lb.; P.G., 1s. 0½d. per lb.

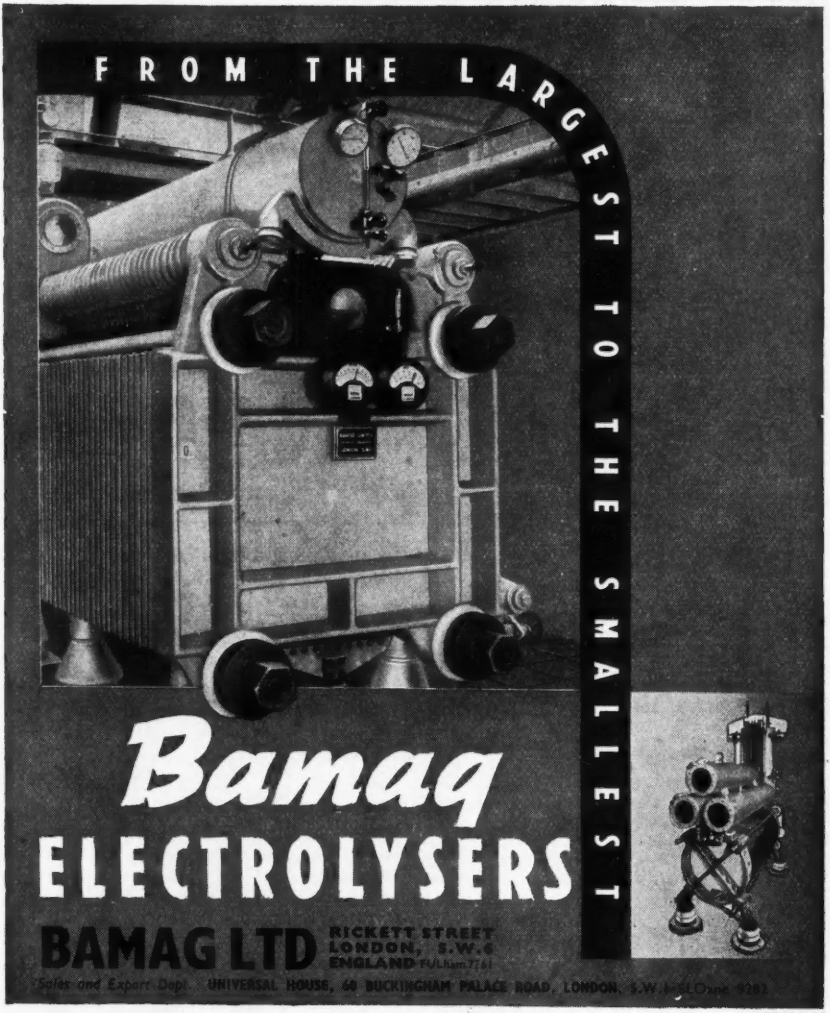
o-**Toluidine.**—1s. per lb., in 8/10 cwt. drums, drums extra.

p-**Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

Latest Oil Prices

LONDON.—September 15. For the period ending September 27 (Oct. 11, 1947 for refined oils), per ton, naked, ex mill, works or refinery, and subject to additional charges according to package; LINSEED OIL, crude, £200. RAPESEED OIL, crude, £190. COTTONSEED OIL, crude, £109; washed, £112. COCONUT OIL, crude, £106; refined deodorised, £112; refined hardened deodorised, £116. PALM KERNEL OIL, crude, £105 10s., refined deodorised, £112; refined hardened deodorised, £116. PALM OIL (per ton c.i.f.), in returnable casks, £99 5s.; in drums on loan, £98 15s., in bulk, £97 15s. GROUNDNUT OIL, crude, £110 10s.; refined deodorised, £114, refined hardened deodorised, £118. WHALE OIL, refined hardened, 42 deg., £117; refined hardened, 46/48 deg., £118. ACID OILS, Groundnut, £94; soya, £92; coconut and palm-kernel, £97 10s. ROSIN: Wood, 40s. 6d. to 48s.; gum, 56s. to 62s. 6d. per cwt., ex store, according to grade. TURPENTINE, American, 87s. per cwt. in drums or barrels, as imported (controlled price).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Patents in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted may be obtained from the Patent Office, Southampton Buildings, London, W.C.2., at 1s. each.

Complete Specifications Open to Public Inspection

Production of alloys of an alkali metal and lead.—A. Johnson & Co. April 22, 1943. 19216/1947.

Chemical process for the manufacture of guanidine nitrate. — Koppers Co., Inc. Jan. 18, 1946. 18857/1947.

Process for manufacture of magnesium products. — Marine Magnesium Products Corporation and G. H. Gloss. May 10, 1943. 21850/1946.

Chemical compounds and processes of preparing the same.—Merck & Co., Inc. Feb. 15, 1946. 3521/1947.

Electrolytic oxidation process.—Merck & Co., Inc. Nov. 6, 1941. 18887/1947.

Oxidation process.—Merck & Co., Inc. Nov. 6, 1941. 18888/1947.

Methods of making condensation products of organic mercaptans and primary amines, and the improved condensation product resulting therefrom.—Monsanto Chemical Co. July 26, 1940. 19110/1947.

Modified rosin esters and compositions containing them.—Montclair Research Corporation. April 14, 1944. 19527-29/1947.

Extraction of vanadium and phosphorus.—Montecatini Soc. Generale Per L'Industria Mineraria e Chimica. April 22, 1939. 19470/1947.

Separation of penicillins.—C. Pfizer & Co., Inc. Oct. 17, 1945. 19111/1947.

Solvent extraction of glycerides and derivatives thereof.—Pittsburgh Plate Glass Co. May 13, 1940. 19458/1947.

Acetyl salicylic acid preparation.—S. Quisling. Jan. 8, 1941. 19310/1947.

Treatment of abietyl compounds.—Ridbo Laboratories, Inc. July 3, 1943. 18962/1947.

Method of preparing cyanamide and derivatives thereof.—Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St-Gobain, Chauny & Cirey. Feb. 15, 1946. 4000/1947.

Catalysts and catalytic processes.—Soc. Normande de Produits Chimiques. Feb. 15, 1946. 4601/1947.

Manufacture of carbon disulphide.—Standard Oil Development Co. March 6, 1943. 24814/1946.

Oxidation process.—Standard Oil Development Co. Nov. 9, 1940. 19905-6/1947.

Method for recovering bitumen contained in peat.—A. F. Sundgren and E. E. Ekman. Feb. 12, 1946. 4099/1947.

Process for effecting catalysed reactions.—Universal Oil Products Co. Jan. 30, 1939. 19580/1947.

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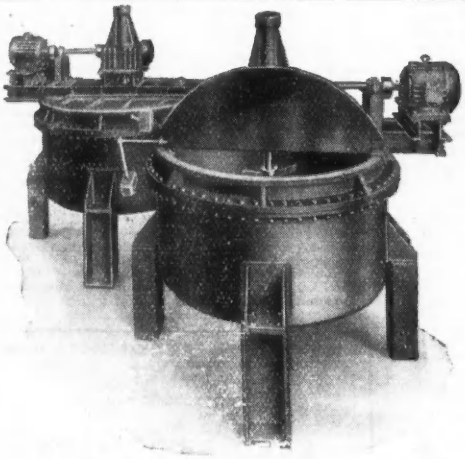

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REPRESENTATIVE for Scientific Glass and Laboratory Ware required for Manchester and district. Applicant should state previous position and salary required. Box No. 2530, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

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Vertical stainless steel powder **MIXER**, 24 in. × 10 in. with 9 in. × 7 in. feed opening, overdriven agitator, arranged for bench moulding.

Vertical open top cylindrical steam jacketed steel **MIXER**, 2 ft. 6 in. dia., 2 ft. 6 in. deep, 2 in. bottom outlet. Standing on three angle iron legs.

Twin vertical **PUG MIXER** overdriven by gearing from fast and loose pulleys 18 in. dia., pans 2 ft. dia. × 2 ft. deep, mounted in H.S. fabricated framework. Overall height 7 ft. 6 in., floorspace 7 ft. × 3 ft. with bottom slide discharge.

Vertical **ALUMINIUM MIXER**, 5 ft. 9 in. × 3 ft. 3 in. deep, fitted horizontal agitating shaft with three aluminium agitators and running through glanded bearing. Direct driven from fast and loose pulleys 12 in. dia. × 2 in. face. Pan fitted with 10 banks of 1¼ in. O.D. copper steam coil 3 ft. 3 in. P.C.D. and loose aluminium covers, fitted 1½ in. bottom run off.

C.I. unjacketed **MIXER**, vertical totally enclosed, fitted over driven mixing gear driven through enclosed worm and wheel by fast and loose pulleys. Pan 5 ft. I.D. × 2 ft. 6 in. overall depth, 9 in. dia. inlet, 6 in. dia. vapour outlet. Overall dimensions 7 ft. 6 in. long × 6 ft. 6 in. wide × 6 ft. 9 in. high.

6 ft. Torrance **EDGE RUNNER MILL.**

Single roll **EDGE RUNNER MILL**, 4 ft. dia. × 6½ in. deep with 3 ft. dia. × 9 in. face granite roll. Fitted roller and pan scraper blades. Underdriven from fast and loose pulleys through bevel wheel and pinion. Overall height 5 ft. 4 in., width 5 ft. 6 in.

Double roll **EDGE RUNNER MILL**, cast iron revolving underbed, 3 ft. dia. × 9 ft. deep with two stationary rotating rolls 18 in. dia. 8 in. face, pan underdriven by fast and loose pulleys through bevel wheel and pinion mounted on cast iron bedplate with hand operated scoop for discharge.

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AUTOCLAVE, vertical, cast steel 39 in. I.D. by 5 ft. 6 in. deep, not jacketed, bolted cover, high pressure, as new £80. THOMPSON & SON (Millwall) Ltd., Cuba Street, Millwall, London, E.14.

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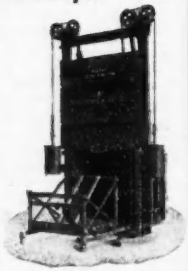

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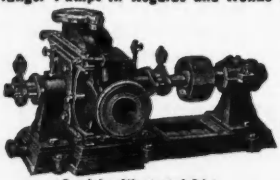

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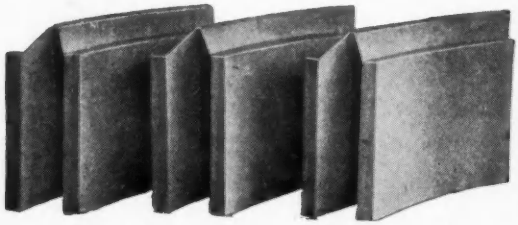

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